EXHIBIT 1

REDACTED

EXHIBIT 2

UNITED STATES DISTRICT COURT
DISTRICT OF DELAWARE

BRIDGESTONE SPORTS CO., LTD., and BRIDGESTONE GOLF, INC., Plaintiffs, v. ACUSHNET COMPANY, Defendant.	Case No. 05-CA-132 (JJF) **INVALIDITY EXPERT REPORT OF DR. DAVID FELKER**
ACUSHNET COMPANY, Counterclaimant, v. BRIDGESTONE SPORTS CO., LTD., and BRIDGESTONE GOLF, INC., Counterdefendant.	

IX. UNITED STATES PATENT NO. 5,803,834

The '834 Patent discloses a two-piece golf ball. The patent claims that the ball has an optimized hardness distribution in the core and a desirable hardness difference between the core and the cover. Col. 2, ll. 22-23. Claim 1, the only claim asserted, reads:

> A two-piece solid golf ball comprising a solid core and a cover enclosing the core and having a number of dimples in its surface, wherein
>
> said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees, a center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees, and a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,
>
> said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees and a gauge[17] of 1.5 to 1.95 mm, and
>
> the number of dimples is 360 to 450.

A. The '834 Patent is Anticipated by Bridgestone's Precept EV Extra Spin Golf Ball

Claim 1 of the '834 patent is anticipated by Bridgestone's own Precept EV Extra Spin golf ball. It is my understanding that Bridgestone sold the two-piece, EV Extra Spin golf ball in the United States as early as 1994,[18] and that a reference is prior art if it was sold in the United States more than one year before Bridgestone filed the application that resulted in the '834 patent (February 27, 1997). Therefore, it is my understanding that the EV Extra Spin is prior art.

I created a protocol for testing of prior art golf balls. Following my direction, engineers performed tests on six EV Extra Spin golf balls that Acushnet acquired in 1996. These tests were performed on equipment that I personally inspected, and it is my opinion that the tests were done properly. The tests results showed the EV Extra Spin golf ball to have the properties

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[17] As used in the '834 patent, the term gauge is equivalent to the term thickness.

[18] *See* AB 4601.

specified in the '834 patent. I have reproduced the raw data obtained by these tests below, as well as table containing my analysis of this data.

1996 PRECEPT EV EXTRA SPIN MEASURED VALUES[19]

Sample No.	1	2	3	4	5	6
Cover Thickness, in	0.073	0.072	0.074	0.072	0.072	0.072
Cover Hardness, JIS-C	86.8	86.2	87.0	87.1	87.1	86.6
	86.5	87.0	87.4	87.0	86.5	86.7
Core Surface Hardness, JIS-C	79.9	80	81.1	80.4	80.6	80.4
	80	80.4	80.1	78.1	80.1	80.2
Core Center Hardness	66.8	64.8	70.7	70.9	66.0	67.3
Hardness at 5mm	77.7	77.7	76.5	74.5	77.7	76.3
	78.6	76.9	77.6	76.7	77.0	76.5
	76.7	77.3	77.9	75.2	76.8	77.3
	78.1	77.3	77.0	75.9	76.7	77.6

1996 PRECEPT EV EXTRA SPIN COMPARISON TO '834 PATENT

Sample No.	1	2	3	4	5	6
Said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees,	80.0	80.2	80.6	79.3	80.4	80.3
a center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees,	13.2	15.4	9.9	8.3	14.4	13.0

---

19 This table shows the raw test data. Cover thickness was found by taking the difference in average diameter, measured at the pole and two equator locations for each golf ball, before and after the cover is removed. The results of two cover hardness measurements, measured once at each pole, are shown here. The results of two core surface hardness measurements, again taken once at each pole, are also shown. Core center hardness was measured once, at the core center. The hardness at 5mm was measured at four discrete points, each of which was 5mm from the core surface. When more than one measurement was taken, the average values are used in the calculations below. (*See* Ex. 24.)

Sample No.	1	2	3	4	5	6
And a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,	2.2	2.9	3.3	3.7	3.3	3.4
Said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees	6.7	6.4	6.6	7.8	6.5	6.3
and a gage of 1.5 to 1.95 mm, and	1.85	1.83	1.88	1.83	1.83	1.83
the number of dimples is 360 to 450.	392	392	392	392	392	392

My opinion, based on the results of these tests, is that the EV Extra Spin golf ball includes each and every limitation of claim 1 of the '834 patent, as follows:

- All balls had a core surface hardness of less than 85 degrees.
- The difference between the center hardness and the surface hardness for all balls was between 8.3 to 15.4 degrees.
- The hardness within 5 mm inside the core surface for all balls was up to 8 degrees lower than the surface hardness.
- The cover hardness was 6.3 to 7.8 degrees higher than the surface hardness of the core.
- The gauge was between 1.83 mm and 1.88 mm
- All the balls had 392 dimples.

It is my opinion that these tests accurately reflect the properties of the golf balls when they were sold. Like the Altus Newing Massy ball, the Precept EV Extra Spin is encased in an ionomer resin cover.[20] Such a cover would protect the core from the possible negative affects of moisture and oxygen permeation. Furthermore, the measurements obtained by my tests correspond with my understanding of the Precept EV Extra Spin's properties as it was originally

[20] *See* AB 0044600

manufactured. For example, the Titleist and Foot Joy Competitive Ball Report, AB 0044585-622, shows the Precept EV Extra Spin as having a core center hardness of 67 degrees, and a core surface hardness of 79 degrees. These values correspond with the hardnesses reported in the table above. The average core surface hardness listed above is 80.1 degrees. The average core center hardness is 67.8 degrees.

As Bridgestone's EV Extra Spin meets all the limitations of the '834 patent, the golf ball anticipates the patent. Therefore, it is my opinion that the '834 patent is invalid.

B. The '834 Patent is Anticipated by the 1993 Wilson Ultra Competition Golf Ball

Claim 1 of the '834 patent is anticipated by the 1993 Wilson Ultra Competition golf ball as well. I understand that Wilson sold the two-piece Ultra Competition in the United States beginning in 1993. As Wilson sold this ball in the United States more than one year before Bridgestone filed the application that resulted in the '834 patent (February 27, 1997), it is my further understanding that the Wilson Ultra is prior art against the '834 patent.

I used the same testing protocol described above to have 1993 Wilson Ultra Competition prior art balls tested. I have reproduced below the data obtained by these tests for several balls that fell within the scope of the claims.

1993 WILSON ULTRA COMPETITION MEASURED VALUES[21]

	1	2	5	6
Cover Thickness	0.073	0.072	0.071	0.073
Cover Hardness	87.9	88.7	88.4	87.6
	88.1	88.1	88.6	87.1
Core Surface Hardness	80.4	79.6	80	80.3
	80.2	79.8	80.5	80.1
Core Center Hardness	66.3	68.4	69.7	65.4

[21] *See* Ex. 49.

Hardness at 5mm	74.5	74.7	74.7	75.4
	72.8	74.2	75.9	74.2
	74.7	73.9	76.2	75.1
	73	72.5	74.1	72.4

1993 WILSON ULTRA COMPETITION COMPARISON TO '834 PATENT

	1	2	5	6
said solid core has such a distribution of hardness as measured by a JIS-C scale hardness meter that a surface hardness is up to 85 degrees,	80.3	79.7	80.3	80.2
A center hardness is lower than the surface hardness by not less than 8 to less than 20 degrees,	14.0	11.3	10.6	14.8
and a hardness within 5 mm inside the core surface is up to 8 degrees lower than the surface hardness,	6.6	5.9	5.0	5.9
said cover has a hardness which is higher than the surface hardness of the core by 1 to 15 degrees	7.7	8.7	8.3	7.2
and a gage of 1.5 to 1.95 mm, and	1.85	1.83	1.80	1.85
the number of dimples is 360 to 450.	432	432	432	432

My opinion, based on the results of these tests, is that the Wilson Ultra Competition golf balls above include each and every limitation of claim 1 of the '834 patent, as follows:

- All balls had a core surface hardness of less than 85 degrees.
- The difference between the center hardness and the surface hardness for all balls was between 10.6 and 14.8 degrees.
- The hardness within 5 mm inside the core surface for all balls was up to 8 degrees lower than the surface hardness.

- The cover hardness was 7.2 to 8.7 degrees higher than the surface hardness of the core.
- The gauge was between 1.80 mm and 1.85 mm
- All the balls had 432 dimples.

As with the other balls discussed above, the Wilson Ultra Competition ball has an ionomer cover.[22] As already discussed, ionomeric covers serve as moisture and oxygen barriers, and protect the core from degradation. Moreover, my measurements correspond with my understanding of the Wilson Ultra Competition's properties as it was originally manufactured. For example the Titleist and Foot Joy Competitive Ball Report, AB 0044585-622, shows the Wilson Ultra Competition as having a core center hardness of 67 degrees, and a core surface hardness of 79 degrees. These values correspond with the hardness reported in the table above. The average core surface hardness listed above is 80.1 degrees. The average core center hardness is 67.5 degrees.[23]

As the above Wilson's Ultra Competition balls meet all the limitations of the '834 patent, the golf ball anticipates the patent. Therefore, it is my opinion that the '834 patent is invalid.

X. UNITED STATES PATENT NO. 6,679,791

The '791 patent is directed to a multi-piece golf ball. This patent asserts that the disclosed golf ball has improved flight distance, controllability, and feel. *See* Ex. 27, Abstract. The only difference between the '791 patent and the '707 patent, however, is that the '791 patent claims a hardness gradient of 22 and above.

Bridgestone is asserting Claims 11, 13, 16, and 26. Claim 11 depends from claim 1 and claim 26 depends from claim 24. Therefore, I have reviewed the validity of claims 1, 11, 13, 16, 24 and 26. Claim 1 of the '791 patent reads:

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[22] *See* AB 0044600.

[23] My opinion is also supported by data from Acushnet's competitive testing performed in 1993 when the balls were first examined. *See* AB 0004466-67. The average test value for core surface hardness in 1993 was 79 degrees and the average core center hardness was 67 degrees, which are comparable with the recently measured values.

XI. CONCLUSION

I reserve the right to supplement this report should new information come to light that bears on my opinions contained in this report. I reserve the right to supplement or modify this report, if appropriate, to the extent that new or additional information is provided. I also reserve the right to consider and comment on additional evidence that may be presented by experts for Bridgestone.

At trial or any hearing in this litigation, I may provide demonstrative aids, such as computer animations, excerpts from relevant exhibits, deposition testimony, and physical examples, to assist in explaining the subject matter discussed in this report.

Signed this sixteenth day of January, 2007.

/s/ David Felker
David Felker, Ph.D.

TAB 1

David L. Felker, PhD
8852 Harmony Grove Road
Escondido, CA 92029
760-468-0816(mobile)
760-480-7515 x13(office)

2/01-present Owner, Sanford Rose Associates- Escondido

- Retained executive search firm filling primarily Director to CEO positions in the Pharmaceutical and Biotechnology industries throughout the USA.

1/01 – present Golf Ball Industry Consultant/Expert Witness

- Provide technical advice and expert testimony in golf ball technology-relayed cases.
- Perform patent analysis and provide technical advice.
- Lead scientific efforts to demonstrate performance differences between golf products for the purpose of providing evidence to support the client's legal position.
- Perform/direct physical property testing and outdoor performance comparison testing efforts.
- Direct/perform statistically designed experiments and thorough analysis of data.

Depositions:

5/8/01 Callaway Golf v. Bridgestone Sports Co. Ltd., Civil Action No. 1 00-CV-1871-JEC

3/6/02 Callaway Golf Company v. Dunlop Slazenger Group Americas, Inc.
Civil Action No. 01-CV-669 RRM

5/22/02 Callaway Golf Company v. Dunlop Slazenger Group Americas, Inc.
Civil Action No. 01-CV-669 RRM

2003 Nitro Leisure Products, LLC v. Acushnet Company, US District Court Southern District of Florida, Case No. 02-14008-CIV-Middlebrooks

Declarations:

Callaway Golf v. Acushnet Company, 7/00

Callaway Golf v. Bridgestone Sports Co. Ltd., 8/00

Acushnet Company v. Nitro Leisure Products, LLC dba Golf ballsdirect.com and Second Chance, and Nitro Leisure Services, LLC dba Nitro Golf and Nitrogolf.com, US District Court Southern District of Florida, Case No. 02-14091-CIV-Roettger, 4/19/02

Nitro Leisure Products, LLC v. Acushnet Company, US District Court Southern District of Florida, Case No. 02-14008-CIV-Middlebrooks, 6/11/02

Nitro Leisure Products, LLC v. Acushnet Company, US District Court Southern District of Florida, Case No. 02-14008-CIV-Middlebrooks, 8/6/02

Nitro Leisure Products, LLC v. Acushnet Company, US District Court Southern District of Florida, Case No. 02-14008-CIV-Middlebrooks, 5/28/03

Expert Reports:
"Remanufactured Golf Ball Testing and Results", 4/18/02

Expert Report for Nitro Leisure Products, LLC v. Acushnet Company, US District Court Southern District of Florida, Case No. 02-14008-CIV-Middlebrooks, 7/8/03

Courtroom Testimony:
8/04 Callaway Golf Company v. Dunlop Slazenger Group Americas, Inc.
Civil Action No. 01-CV-669 RRM

12/96-10/00 Vice President of Research & Development, Callaway Golf Ball Company, Carlsbad, CA (Start-Up Company wholly owned subsidiary of Callaway Golf Company)

- Charter member of executive team that built $170 M Start-up Company from scratch.
- Designed and developed the entire R&D function and company's first products; $6M R&D annual operating budget; jointly responsible for Golf Ball Company P&L.
- Lead the effort that produced four *Demonstrably Superior and Pleasingly Different* (DSPD) golf ball models: *Rule 35, CTU 30, CB-1* and *HX*". Total sales for these four products were $55M in 2001. The Rule 35's performance set a new standard that stunned the golf ball industry. Additionally, the "HX" is revolutionary in that it is a "dimple free" golf ball.
- Lead the patent effort that enabled the introduction of patented products in an extremely crowed art; did so without legal issues at product launch.
- Inventor of golf ball/club products and golf ball manufacturing processes.

PATENTS
- 5,984,807 Golf Ball
- 6,200,512 Method of Manufacturing a Golf Ball
- 6,213,892 Multi-layer Golf Ball
- 6,245,386 Method and system for finishing a golf ball
- 6,390,932 Compliant polymer face golf club head
- 6,440,346 Method for making golf ball
- 6,607,451 Compliant polymer face golf club head
- 6,786,837 Golf balls and methods of manufacturing the same

11/94-12/96: Technology Superintendent – Neoprene, DuPont Dow Elastomers, Louisville, KY

- Responsible for:World-wide Neoprene Adhesives and Latex Development & Technical Services, Hypalon™ Adhesives Development & Tech Services, Louisville Manufacturing Technical Support (worlds largest polychloroprene facility), Capital Project Implementation ($15-25M in capital projects/yr), World-wide Neoprene Research & Development, Technical support of Quality Control and Environmental Laboratories
- Directed 50 person organization; $6M Technology Budget
- Leader of high priority Task Team of scientists from DuPont, DuPont-Dow Elastomers and various Universities working on the next generation process and products.

9/91-11/94: Technical Area Superintendent - Neoprene, DuPont Company, Louisville, KY

- Responsible for: Manufacturing Engineering & Process Support, Capital Project Implementation ($10-40M in Capital projects/yr), ISO 9000 Certification, Quality Control and Environmental Laboratories, and Technical Computing Upgrade. Managed 16 person organization; $2M Technology Budget.
- Working-Leader of International Task Team that solved 40 yr old Neoprene Quality/Manufacturing problem, delivering >$10M/yr ATOI.

9/90-9/91: Hypalon™ Technology Area Superintendent
Elastomers Division, DuPont Beaumont Works, Beaumont, TX

Responsibilities same as 9/89-9/90 position plus responsible for :

- Research & Development of a CCl_4-free Commercial HYPALON™ Process.
- Process development and production of chlorinated EVA/PE polymer in elastomer plant.
- Montreal Protocol liaison for HYPALON™ Business.
- Assembled and lead task team of scientists, lobbyists, and lawyers who developed and implemented a creative win/win solution to a HYPALON™ environmental problem that literally saved the business ($>30M NPV). Received DuPont Board of Directors Award for preventing Shutdown of HYPALON™ Business.

9/89-9/90: Hypalon™ Manufacturing Technology Area Superintendent

- Managed group of 10 responsible for Plant Manufacturing Engineering, Capital Project Implementation, Technical support of Quality Control and Environmental Laboratories
- Received DuPont Award for increasing plant production of Cl-EVA 400% using fundamental process understandings and statistically designed experiments.

9/86-9/87: Product Development Engineer: Nylon Compounding/Elastomer Toughened Polymers, DuPont Washington Works Plant, Parkersburg, WV

Developed family of elastomer toughened/reinforced ZYTEL™ compounded products with super high flow properties. Responsible for plant engineering support for carbon black filled Nylon and polyester products.

9/87-9/89 Manufacturing Engineer: DuPont Advanced Glazing Venture, Parkersburg, WV

Part of Team that successfully developed and introduced the Anti-Lacerative Windshield™ and SpallShield™. Primarily responsible for pilot plant operation and managing contract coating operations with w/ Polaroid Corp, Custom Coating & Laminating Inc. and Rexham Corp.

10/84-9/86: Research Engineer Long Range Research Group
Polymer Products Department, DuPont Experimental Station, Wilmington, DE

Product and Process R&D focused on a ARYLON™ (new aromatic polyester targeted at the auto industry).

EDUCATION:
Aug 1984: Iowa State University, Ames, Iowa
Ph.D. Chemical Engineering. Thesis: Electrochemical dissolution of copper sulphide minerals using a Fluidized Bed Electrochemical Reactor.
Recipient of the Iowa State University Mining & Mineral Resources Research Institute Fellowship, 1981-1983. Overall G.P.A. 3.69/4.00

M.S. Chemical Engineering Aug 1982. Thesis work included experimental and mathematical studies dealing with the electrodeposition of copper using a fluidized bed electrochemical reactor. Overall G.P.A. 3.68/4.00

University of Wisconsin-Eau Claire, Eau Claire, Wisconsin 1976-1979
Received B.S. in Chemistry May of 1979. Class work included advanced organic chemistry and several semesters of independent research. Overall G.P.A. 3.20/4.00

OTHER ACADEMIC RESEARCH EXPERIENCE:
1979--National Science Foundation Undergraduate Research Participant. Worked under the guidance of Dr. George A. Kraus, Department of Chemistry, Iowa State University. Research included the investigation of the reaction of dienolate anions with Michael acceptors.

1977-1979--Research Assistant at the University of Wisconsin-Eau Claire. Worked under the guidance of Dr. William C. Groutas. Research included the synthesis of functionalized alpha methylene valerolactones fused to substituted aromatic rings, pancreatic elastase inhibiting imidazole-N-carboxamides, and N,N'-ethylene bis [2(2-hydroxy-5bromophenyl)l glycine.

PAPERS PUBLISHED
William C. Groutas and David L. Felker, "Synthetic applications of Cyanotrimethylsilane, Iodotrimethylsilane, Azidotrimethylsilane, and Methylthiotrimethylsilane," Synthesis, No. 11, 861-868, November (1980).

William C. Groutas, David L. Felker, David R. Magnin, George Meitzner, and Terry Gaynor, "Synthesis of Functionalized Alpha-Methylene Lactones" Synthetic Communications 10 (1), 1-9 (1980)

William C. Groutas, David L. Felker and David R. Magnin, "Synthesis of Aromatic AlphaMethylene Lactones", Synthetic Communications 10 (5), 355-362 (1980).

William C. Groutas, R.C. Badger, T.D. Ocain, D.L. Felker, J. Frankson and M. Theodorakis, "Mechanism-Based Inhibitors of Elastase", Biochemical and Biophysical Research Communications, Vol. 95, No. 4, 1980-1894 (1980).

Michael C. Theodorakis, William C. Groutas, Alex J. Bermudez, David L. Felker, StavroulaVani Stefanakou, David R. Magin, and Terry Gaynor, "Localization of Technetium-99mN,N'-ethylene-bis [2(2-hyd roxy-5-b romophenyl)] glycine and Technetium-99m-[N-2(2mercapto-l-oxo-propylglycine)] in the Hepatobiliary System",
Submitted to J. Pharmaceutical Sciences for publication.

David L. Felker and Renato G. Bautista, "The Electrowinning of Copper Using a Side-By-Side Fluidized Bed Electrochemical Reactor", published in IE&C Process Design and Development.

David L. Felker and Renato G. Bautista, Electrochemical Processes in Recovering Metals from Ores, Journal of Metals, April 1990, 60-63.

Videotape : How to Grow Gourmet Oyster Mushrooms, April 1995

"Advances in Neoprene Technology", 1996 (definitive scientific text internally published in DuPont under my direction)

PAPERS PRESENTED:

22nd Undergraduate Chemistry Symposium, Minnesota Chapter of the American Chemical Society, Bethel College, Spring 1978, "Design and Synthesis of Potential Cytotoxic Agents", coauthored by William C. Groutas and David L. Felker, presented by David L. Felker.

Society of Mining Engineers of the AIME Fall Meeting and Exhibit, Minneapolis Auditorium and Convention Hall, Minneapolis, Minn., Oct. 22-24, 1980, "The Electrowinning of Copper from Sulphate Solutions in a Fluidized Bed Electrochemical Reactor", coauthored by Chang C. Ko, David L. Felker, Harvey Jensen, and Renato G. Bautista, presented by David Felker.

The Metallurgical Society of the AIME Annual Meeting, Dallas Convention Center, Dallas, Texas, Feb. 14-18, 1982, "Design Considerations for the Scale-Up of a Fluidized Bed Electrochemical Reactor (FBER)", coauthored by David L. Felker and Renato G. Bautista, presented by David L. Felker.

The Metallurgical Society of the AIME Annual Meeting, Hyatt Regency Hotel, Atlanta, Georgia, March 6-10, 1983, "A Model for Predicting the Concentration-Time Relationship using a FBER", coauthored by David L. Felker and Renato G. Bautista, presented by Renato G. Bautista.

TMS-SME Annual Mtg, Denver, Colorado, Feb 24-27, 1987 , "A mathematical model for the electrochemical reduction of chalcopyrites using a fluidized bed electrochemical reactor", coauthored by David L. Felker and Renato G. Bautista, presented by David L. Felker.

TMS-SME Annual Mtg, Denver, Colorado, Feb 24-27, 1987 , "The two-stage dissolution and separation of Cu, Fe, and S from chalcopyrite using a fluidized bed electrochemical reactor", coauthored by David L. Felker and Renato G. Bautista, presented by David L. Felker.

Proprietary Presentations at DuPont Polymer Products Department annual TECH-CON, 1985, 1986.

Proprietary Presentation at DuPont Polymer Products Department annual Polymer Compounding Conference, Parkersburg WV, 1987.

PERSONAL DATA:

U.S. Citizen, married, born 6/10/57, 6'1", 200 lbs., excellent health.
Hobbies and interests include swimming, painting, hiking, skiing, tennis, flying military aircraft, golf and fly-fishing.

EXHIBIT 3

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BRIDGESTONE SPORTS CO. LTD., AND BRIDGESTONE GOLF, INC Plaintiff, v. ACUSHNET COMPANY Defendant.	Case No. 05-132(JJF)
ACUSHNET COMPANY Counterclaim-Plaintiff, v. BRIDGESTONE SPORTS CO. LTD.,, AND BRIDGESTONE GOLF, INC Counterclaim-Defendant.	

EXPERT REPORT OF EDWARD M. CAULFIELD, Ph.D., P.E.

REPORT OF EDWARD M. CAULFIELD

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REPORT OF EDWARD M. CAULFIELD

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REPORT OF EDWARD M. CAULFIELD

REPORT OF EDWARD M. CAULFIELD

I. INTRODUCTION

1. My name is Edward M. Caulfield, Ph.D., P.E. I am President and Chief Technical Officer of Packer Engineering, Inc, a multi-disciplinary engineering consulting and technical services company with locations in Naperville, Illinois, Cincinnati, Ohio, Washington D.C., and Ann Arbor, Michigan. Packer Engineering offers a wide range of engineering, testing, and analysis services, including extensive work in the mechanical engineering and materials engineering fields.

2. I have been retained in this matter to evaluate golf balls manufactured by the Defendant, Acushnet, in connection with US patents 5,262,652; 5,553,852; 5,743,817; 5,782,707; 5,803,834; 6,634,961; and 6,679,791 (held by Bridgestone Sports Co,. LTD) in conjunction with an investigation of patent infringement issues. Packer Engineering is charging my normal hourly rate of $475.00/hour for my time spent in this matter and neither Packer Engineering. nor I have any financial or other interest in the outcome of this case or in any of the parties to this action.

II. QUALIFICATIONS

3. I have a Ph.D. in Theoretical and Applied Mechanics, an M.S. in Theoretical and Applied Mechanics, and a B.S. in Mechanical Engineering in Machine Design.

4. I am a member of Sigma Xi (Scientific Honorary Society) and have published and/or presented numerous technical papers. These papers are listed in my curriculum vitae (CV) attached as Exhibit EX-1. I have also presented numerous seminars to audiences with a wide range of interests, a list of which is also set forth in Exhibit EX-1.

REPORT OF EDWARD M. CAULFIELD

5. I am a Professional Engineer registered in the State of Illinois and in the State of Florida, and I am also affiliated with the following professional organizations:

   American Society of Mechanical Engineers
   American Society of Testing and Materials
   Society for Experimental Mechanics
   American Association for Automotive Medicine
   Society of Automotive Engineers
   Illinois Society of Professional Engineers
   National Society of Professional Engineers

6. Before joining Packer Engineering in 1979, I was an Assistant Professor in the Department of Mechanical Engineering at the University of Illinois and taught courses in dynamics, vibration, materials science and the design of machinery.

7. In my educational background and duties at Packer Engineering, I have developed a thorough understanding of the properties and behavior of materials and mechanical design issues. My personal practice involves the application of materials engineering and mechanical engineering principles to design review and evaluation, failure analysis, patent infringement analysis, accident investigation and reconstruction, and testing. Since joining Packer Engineering in 1979, I have consulted for a wide range of industrial clients, including golf equipment manufacturers, farm machinery and industrial equipment manufacturers and automobile makers.

8. Based on my education, training, knowledge of the literature, and professional experience, I am fully competent to testify regarding the subject matters of, among other things, the material properties and material property testing of golf balls including those material properties described and claimed in the patents at issue in this matter.

REPORT OF EDWARD M. CAULFIELD

9. Additional details regarding my qualifications and background can be found in my attached CV and Rule 26 list of cases in which I have testified (Exhibit EX-1)

III. MATERIALS CONSIDERED

10. In addition to information as a result of my general background and experience, I have reviewed and asked my engineering staff to help in the review of materials relating to the patents-in-suit as listed in Exhibit EX-2. Exhibit EX-3 contains the testing standards utilized in the test protocols for this investigation.

IV. METHODOLOGY

11. This investigation included the evaluation of a number of golf balls manufactured by Acushnet Company for their material properties and performance as related to the patents at issue in this matter. The Acushnet golf balls evaluated in this study included Titleist Pro V1, Titleist Pro V1x, Titleist Pro V1 Star, Titleist DT So/Lo balls, Titleist NXT, Titleist NXT Tour and Pinnacle Exception golf balls. All balls included in this investigation were obtained from standard retail outlets.

12. A number of evaluations related to the patents at issue were conducted on these golf balls. Determination of which material properties to be evaluated in this investigation was performed by Mr. Larry Cadorniga. In consulting with Mr. Cadorniga, I determined the manner in which these properties were to be tested. These material properties included hardness and specific gravity of the core, intermediate layer and cover, 100 kg distortion of the ball and core, thickness and diameter of various golf ball components and a rebound/drop test. Test protocols were developed for each specific test requested

by Mr. Cadorniga. When developing these test protocols, I relied upon my background and personal experiences, as well as published testing standards by organizations such as The American Society of Testing Materials (ASTM) and Japanese Industrial Standards (JIS). Testing was conducted after a review of these protocols by Mr. Cadorniga. The test protocols developed and utilized in the evaluations of these golf balls are contained in Exhibits EX-4 to EX-12. The results of these evaluations are presented in the following section of this report.

13. The table below identifies the individual golf balls tested during this investigation. A "Golf Ball Model" designation was assigned to identify different versions of the same brand name golf ball manufactured by Acushnet. The model designation was necessary because Acushnet manufactures different revisions of golf balls under the same brand name. For example, as shown in the table below, Acushnet manufactured a total of four different versions of the Pro V1 golf ball. These four different versions are identifiable by the sidestamp markings on the side of the golf ball as well as the core color. In order to distinguish these different versions of the same brand name golf ball, "Golf Ball Model" designations were assigned to the different versions of the golf balls as listed in this table. For example, a P4 designation denoted a Pro V1 golf ball consisting of a green core and ◀Pro V1-392▶ sidestamp whereas a P3 designation denoted a Pro V1 golf ball consisting of a dark blue core and ◀•Pro V1 392•▶ sidestamp.

REPORT OF EDWARD M. CAULFIELD

Brand	Name	Sidestamp	Core Color	Golf Ball Model
Titleist	Pro V1	Pro V1 392*	Violet	**P1**
		◀Pro V1•392▶	Violet	**P2**
		◀•Pro V1 392•▶	Dark Blue	**P3**
		◀Pro V1-392▶	Green	**P4**
	Pro V1*	◀Pro V1* 392▶	Yellow/Blue	**PS**
	Pro V1x	◀•Pro V1x 332•▶	Orange/Blue	**PX1**
		◀Pro V1x-332▶	Dark Rd/Gray	**PX2**
	NXT	◀NXT▶	Dark Red	**N1**
		◀-NXT-▶	Red	**N2**
	NXT Tour	◀NXT•Tour▶	Royal Blue	**NT1**
		◀NXT Tour▶	Dark Green	**NT2**
		◀NXT-Tour▶	Black/Yellow	**NT3**
	DT So/Lo	DT So/Lo	Dark Orange	**D1**
		◀DT So/Lo▶	Aqua Blue	**D2**
Pinnacle	Exception	Pinnacle Exception	Light Green	**E1**
		Pinnacle	Light Blue	**E2**

* Sidestamp "Pro V1 392" in the table above includes both versions of the Pro V1 golf ball bearing the sidestamp "Pro V1 392", Pro V1 392 and Pro V1 392 (stretched).

V. RESULTS

A. Specific Gravity

14. The results of the specific gravity testing for Titleist Pro V1x (models PX2 and PX1), Pro V1 (models P4 and P3) and Pro V1 Star (model PS) golf balls are shown in Exhibit EX-13, Table I, Specific Gravity Results for Pro V1x, Pro V1 and Pro V1 Star. For each individual ball tested, the specific gravity of the core, intermediate layer and cover were determined. All testing was performed in accordance with the specific gravity test protocol contained in Exhibit EX-5. Table I reports the average, standard deviation, minimum and maximum value of the specific gravity for each component from twenty-four (24) balls from golf ball models PX2 and P4. Twelve (12) balls were tested from golf ball models PX1, P3 and PS.

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B. Core Rebound

15. The results of the Core Rebound testing for Titleist Pro V1x (model PX2), Pro V1 (model P4), NXT Tour (model NT3), NXT (model N2) and DT So/Lo (model D2) golf balls, sold in both the United States and Japan, are shown in Exhibit EX-14, Table II, Core Rebound Results for Pro V1x, Pro V1, NXT Tour, NXT and DT So/Lo. The rebound testing was performed in accordance with the rebound test protocol contained in Exhibit EX-6. The values reported in Table II contain the average, standard deviation, minimum and maximum values for the combined average values for each ball model. For this test a total of ten (10) cores were used for each ball model except the Pro V1 (P4) where twelve (12) cores were utilized. Each individual core was dropped three times and the results of these three drops were used to obtain the average rebound height for each individual ball. In five instances, only two drops were used to calculate the average rebound height.

16. In four of these instances, a difference of greater than 6.5 mm was observed between the lowest and highest rebound height value. In all four of these instances the low value was significantly different (lower) compared to the other two rebound heights and as such this low value was not used to calculate the average rebound height for that specific core. It is believed the core most likely grazed the 50 mm diameter ring gauge located at a height of 840 mm above the rebound striking surface during the tests which resulted in significantly lower rebound height values. As stated in the test protocol (Exhibit EX-6), the ball must successfully fall and rebound through this ring gauge to be a valid test.

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17. In the fifth instance, the test data from one drop of the core identified as P4.JPN.20 was not recorded correctly. An error occurred during the saving of the high speed video file from this specific drop.

C. Ball and Core Compression – Distortion Under 100 kg Load

18. The results of the compression testing, for determining the distortion under 100 kg load, for Titleist NXT Tour (models NT3 and NT2), NXT (models N2 and N1), DT So/Lo (models D2 and D1), and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-15, Table III Compression - Distortion Under 100 kg Load for NXT Tour, NXT, DT So/Lo and Pinnacle Exception. All compression was performed in accordance with the test protocol for ball and core distortion under a 100 kg load contained in Exhibit EX-7. Seventy-two (72) balls were tested from golf ball models NT3, D2 and N2. Forty-eight (48), fifty-two (52), twenty-three (23), twenty-one (21) and twenty (20) balls were tested from golf ball models E2, E1, NT2, N1 and D1, respectively. Each ball and core was tested one time. The data in Table III represents the average, standard deviation, minimum and maximum values for each model tested.

D. Cover and IML Thickness – Pro V1, Pro V1x and Pro V1 Star

19. The results for the cover and intermediate layer (IML) thickness testing for Pro V1x (models PX2 and PX1), Pro V1 (models P4, P3 and P2) and Pro V1 Star (model PS) golf balls are shown in Exhibit EX-16, Table IV, Cover and Intermediate Layer Thickness for Pro V1, Pro V1x and Pro V1 Star. As discussed in the test protocol (Exhibit EX-8), both the cover and IML thickness was measured at six random spots around the ball's

circumference. The average of these six values was then calculated for each individual ball. Seventy-two (72) balls were tested from golf ball models P4 and PX2. Thirty-five (35), five (5), twenty-four (24) and forty-three (43) balls were tested from golf ball models P3, P2, PS and PX1, respectively. Exhibit EX-26 contains seven bar charts, six of which represent the number of balls as a function of average cover thickness for each individual ball tested for golf ball models PX2, PX1, P4, P3, P2 and PS, respectively. The last chart is a compilation of all the Pro V series golf balls (models PX2, PX1, P4, P3, P2 and PS).

20. Exhibit EX-27 contains seven bar charts, six of which represents the number of balls as a function of average intermediate layer (IML) thickness for each individual ball tested for golf ball models PX2, PX1, P4, P3, P2 and PS, respectively. The last chart is a compilation of all the Pro V series golf balls (models PX2, PX1, P3, P2 and PS) except golf ball model P4. Model P4 was excluded from the combined data since Acushnet manufacturing guidelines dictate the P4 model is manufactured with a larger IML compared to the other Pro V series models (models PX2, PX1, P3, P2 and PS).

E. Cover Thickness – NXT Tour, NXT, DT So/Lo and Pinnacle Exception

21. The cover thickness results for NXT Tour (models NT3 and NT2), NXT (models N2 and N1), DT So/Lo (models D2 and D1), and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-17, Table V, Cover Thickness Results for NXT Tour, NXT, DT So/Lo and Pinnacle Exception. As stated in the test protocol (Exhibit EX-8), the cover thickness was measured at six random spots around the ball's circumference.

The average of these six values was then calculated for each individual ball. Seventy-two (72) balls were tested from golf ball models NT3, N2 and D2. Forty-seven (47), fifty-two (52), twenty-three (23), twenty-one (21), and twenty (20) balls were tested from golf ball models E2, E1, NT2, N1 and D1, respectively.

22. Exhibit EX-28 contains eight bar charts representing the number of balls as a function of average cover thickness for each individual ball tested for golf ball models NT3, NT2, N2, N1, D2, D1, E2 and E1, respectively.

F. Core Hardness

23. The core hardness results for Pro V1 (model P2), Pro V1 Star (model PS), NXT models (models N2 and N1), DT So/Lo (models D2 and D1) and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-18, Table VI, Core Hardness (JIS C) for Pro V1, Pro V1 Star, NXT, DT So/Lo and Pinnacle Exception. All core hardness testing was performed in accordance with the core hardness test protocol contained in Exhibit EX-9. For golf ball model PS, twenty-four (24) golf balls were tested and core hardness testing was only performed on the surface of the core.

24. Golf balls Pro V1 (model P2), NXT (models N2 and N1), DT So/Lo (models D2 and D1) and Pinnacle Exception (models E2 and E1) were all tested at the core surface and as well as at the core center. Sixty (60) balls were tested for golf ball models N2 and D2. Thirty-six (36), fifty-two (52), twenty-one (21), twenty (20) and five (5) balls were tested from golf models E2, E1, N1, D1 and P2, respectively.

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25. In Table VI, the average value reported for the core surface represents the combined average of all balls tested for each ball model tested. In accordance with the test protocol (Exhibit EX-9), hardness measurements were performed at five different locations around the core's circumference. An average core surface hardness value was then calculated for each individual ball. The combined average, standard deviation, minimum and maximum values reported for each golf ball model in Table VI were then determined from the individual ball average hardness values.

26. Two significantly different core colors were observed between balls from golf ball models E2 and D2. Group FF from golf ball model D2 had a dark blue core whereas the other D2 model balls had aqua blue cores. These darker blue cores (Model D2, Group FF) had a lower surface hardness compared to the other model D2 balls tested. The average surface hardness from nine (9) model D2, group FF balls, was 75.2 JIS C compared to the overall D2 model average of 82.1 JIS C.

27. Cores from group GG, golf ball model E2, also contained cores whose color differed from the other cores from model E2. These cores (model E2, group GG) were very light blue colored whereas the other cores from group E2 had a darker blue core. The surface hardness on golf ball model E2, group GG were lower compared to the other balls tested from model E2. The average surface hardness from nine (9) model E2, group GG balls, was 73.9 JIS C compared to the overall E2 model average of 79.1 JIS C.

28. In Table VI, the average value reported for the core center hardness represents the combined average of all individual balls tested for each ball model tested. In accordance

with the test protocol (Exhibit EX-9), five hardness measurements were performed at core's center. An average core center value was then calculated for each individual ball. The combined average, standard deviation, minimum and maximum values reported for each golf ball model in Table VI were then determined from these individual ball average hardness values.

29. In addition to the core surface and core center hardness testing, twenty-four balls (24) from golf balls NXT (model N2) and Pinnacle Exception (models E2 and E1) and twenty-two (22) from DT So/Lo (model D2) were also tested for hardness using specimens prepared from the core's outermost 5 mm. This testing was performed in accordance with the "Hardness at 5 mm Within the Surface of the Core" section of the Core Hardness and Diameter Measurement Protocol contained Exhibit EX-9. In accordance with the protocol, these test samples extended radially from the core's surface to a depth of 5 mm below the core surface. On each ball, five hardness measurements were performed at the center of the plane representing a depth of 5 mm radially below the core surface. This hardness measurement represents the core hardness within 5 mm of the core surface.

30. In Table VI, the average value reported for the core hardness within 5 mm of the core surface represents the combined average of all balls tested for each golf ball model tested. The combined average, standard deviation, minimum and maximum values reported for each golf ball model in Table VI were determined from the individual ball average hardness values.

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31. The difference between the hardness at the core surface and hardness within 5 mm of the core surface was computed using the average hardness values at these two locations for each individual ball. Exhibit EX-29 contains four bar charts showing the number of balls as a function of the hardness difference between the core surface and material within 5 mm of the core surface for each individual ball tested for golf ball models N2, D2, E2 and E1. Table VI contains the combined average of this hardness difference for each golf ball model tested.

G. Core Hardness Gradient – Pro V1x (PX2 and PX1)

32. The core hardness gradient test results for Pro V1x (models PX2 and PX1) golf balls are shown in Exhibit EX-19, Table VII, Pro V1x Core Hardness Gradient (JIS C). Sixty (60) and forty-three (43) golf balls were tested from models PX2 and PX1, respectively. The surface and core center hardness testing was performed as described in paragraphs 25 and 28 above.

33. In addition to the surface and core center, hardness testing was also performed at a distance of 3.5 mm, 7 mm and 13.4 mm below the core's surface. In accordance with the test protocol (Exhibit EX-9), on each individual ball, five hardness measurements were performed at each of these locations. An average value was then calculated for each of the three locations for every individual ball. The combined average, standard deviation, minimum and maximum values reported for each golf ball model in Table VII were then determined from these individual ball average hardness values.

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34. Exhibit EX-30 contains sixty-one charts, sixty of which depict the core hardness gradient for each individual model PX2 ball tested. The final chart depicts the combined average core hardness gradient for golf ball model PX2. There are five points plotted on each of the charts representing the five hardness test locations described above.

35. Exhibit EX-31 contains forty-four charts, forty-three of which depict the core hardness gradient for each individual model PX1 ball tested. The final chart depicts the combined average core hardness gradient for golf ball model PX1. There are 5 points plotted on each of the charts representing the five hardness test locations described above.

H. Core Hardness Gradient – Pro V1 (P4 and P3)

36. The core hardness gradient test results for Pro V1 (models P4 and P3) golf balls are shown in Exhibit EX-20, Table VIII, Pro V1 Core Hardness Gradient (JIS C). Sixty (60) and thirty-five (35) golf balls were tested from models P4 and P3, respectively. The surface and core center hardness testing was performed as described in paragraph 25 and 28 above.

37. In addition to the surface and core center, hardness testing was all performed at a distance of 6.5 mm and 13 mm below the core's surface for model P4. Due to the P3 model's larger nominal core diameter, these dimensions were increased slightly to 6.6 mm and 13.1 mm for the P3 model. In accordance with the test protocol (Exhibit EX-9), on each individual ball, five hardness measurements were performed at each of these locations. An average value was then calculated for each of these locations for every individual ball. The combined average, standard deviation, minimum and maximum values reported

for each golf ball model in Table VIII were then determined from these individual ball average hardness values.

38. Exhibit EX-32 contains sixty-one charts, sixty of which depict the core hardness gradient for each individual P4 ball tested. The final chart depicts the combined average core hardness gradient for golf ball P4. There are four (4) points plotted on each of the charts representing the four hardness test locations described in paragraphs 36 and 37 above.

39. Exhibit EX-33 contains thirty-six charts, thirty-five of which depict the core hardness gradient for each individual P3 ball tested. The final chart depicts the combined average core hardness gradient for golf ball model P3. There are of four (4) points plotted on each of the charts representing the four (4) hardness test locations described in paragraphs 33 and 34 above.

I. IML Hardness – Packer Engineering Prepared Plaques

40. The intermediate layer (IML) hardness test results, performed on Packer Engineering prepared plaques in accordance with Exhibit 11, for Pro V1x (models PX2 and PX1), Pro V1 (models P4 and P3), and Pro V1 Star (model PS) golf balls are shown in Exhibit Ex-21, Table IX, Intermediate Layer Hardness Results for Pro V1x, Pro V1 and Pro V1 Star (Packer Engineering Prepared Plaques). Seven (7), four (4), eight (8), three (3), and four (4) hardness plaques were prepared and tested in accordance with the Test Protocol for Intermediate Layer Hardness contained in Exhibit EX-10 from golf ball models PX2, PX1, P4, P3 and PS, respectively. IML test plaque PX1.TT was not utilized due to an

uneven test surface. As such, only three test plaques were used in the values calculated for model PX1.

J. Cover Hardness – Acushnet Prepared Plaques

41. The cover hardness test results, performed on Acushnet prepared plaques, for NXT Tour, NXT and DT So/Lo golf balls are shown in Exhibit EX-22, Table X, Cover Hardness (Acushnet Prepared Plaques) for NXT Tour, NXT and DT So/Lo. The thirty-six (36) test plaques were identified with Bates numbers AB0087883 – AB0087918. All thirty-six (36) plaques were also identified with a hand written date of 7/23/2004 on the top side of each test plaque. Testing on these plaques was performed in accordance with the Test Protocol for Cover Hardness – Acushnet Prepared Plaques contained in Exhibit EX-11. The values reported in Table X represent the combined average, standard deviation, minimum, and maximum values determined from the individual plaque average hardness values.

K. Cover Hardness – Packer Engineering Prepared Plaques

42. The cover hardness test results, performed on Packer Engineering prepared plaques for NXT Tour (models NT3 and NT2), NXT (models N2 and N1), DT So/Lo (models D2 and D1) and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-23, Table XI, Cover Hardness (Packer Engineering Prepared Plaques) for NXT Tour, NXT, DT So/Lo and Pinnacle Exception. Packer Engineering prepared and tested three plaques from each ball model in accordance with the Test Protocol for Cover Hardness – Packer Engineering Prepared Plaques contained Exhibit EX-12. The values reported in

Table XI represent the combined average, standard deviation, minimum, and maximum values determined from the individual plaque average hardness values.

L. Ball Diameter

43. The results of the ball diameter measurements for Pro V1x (models PX2 and PX1), Pro V1 (models P4, P3 and P2), Pro V1 Star (model PS), NXT Tour (models NT3 and NT2), NXT (models N2 and N1), DT So/Lo (models D2 and D1) and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-24, Table XII, Ball Diameter Results.

M. Core Diameter

44. The results of the core diameter measurements for Pro V1x (models PX2 and PX1), Pro V1 (models P4, P3 and P2), Pro V1 Star (model PS), NXT Tour (models NT3 and NT2), NXT (models N2 and N1), DT So/Lo (models D2 and D1) and Pinnacle Exception (models E2 and E1) golf balls are shown in Exhibit EX-25, Table XIII – Core Diameter Results.

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VI. CONCLUSION

45. I hereby declare under penalty of perjury that all of the foregoing statements are based on my personal knowledge and are true and correct to the best of my knowledge and belief. If called upon as a witness, I could and would testify competently to the matters stated in this report.

E.M. Caulfield

Dated: January 15, 2007

Edward M. Caulfield, Ph.D., P.E.
President and Chief Technical Officer

EX-1

Edward M. Caulfield, Ph.D., P.E.

President and Chief Technical Officer

EDUCATION - DEGREES

Ph.D. Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, 1979
M. S. Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign, 1974
B.S. Mechanical Engineering, University of Illinois at Urbana-Champaign, 1972

HONORS

1976 - Award for excellence in undergraduate teaching, University of Illinois at Urbana-Champaign (campus-wide)

1975 - J. 0. Smith award for excellence in undergraduate teaching, Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign.

2000 - First TAM Distinguished Alumni Award for technical accomplishments in Theoretical and Applied Mechanics, and serving in a professional and technical capacity that reflects honor on the department and University, Department of Theoretical and Applied Mechanics, University of Illinois at Urbana-Champaign.

SOCIETIES

Sigma Xi, ASME, ASTM, ISPE, NSPE, SAE, AAAM, HFES

REGISTRATION

Registered Professional Engineer in State of Illinois
Registered Professional Engineer in State of Florida

ACADEMIC AND TEACHING EXPERIENCE

1978-1979	University of Illinois at Urbana-Champaign, Department of Mechanical Engineering - Assistant Professor-Machine Design
1972-1978	University of Illinois at Urbana-Champaign, Department of Theoretical and Applied Mechanics - Graduate Research and Teaching Assistant

INDUSTRIAL EXPERIENCE

1998 - Present	Packer Engineering, Inc. Naperville, IL President & Chief Technical Officer

1995 - 1998	Packer Engineering, Inc. Naperville, IL President
1990 -1995	Packer Engineering, Inc. Naperville, IL Chief Operating Officer Executive Vice President
1986 - 1990	Packer Engineering Associates, Inc. Naperville, IL Vice President
1979 - 1985	Packer Engineering Associates, Inc. Naperville, IL Director of Mechanical Engineering
1975 - 1978	Structural Dynamics Research Corporation (SDRC) Cincinnati, OH Consulting and seminar presentations Fatigue, Fracture Mechanics, Failure Analysis & Prevention
1975 - 1978	Consultant to members of Ground Vehicle Industry Fatigue, Fracture Mechanics, Failure Analysis, Dynamics of Machinery
1969 - 1972	Teletype Corporation Skokie, IL Cooperative Education

NON-PUBLISHED CORPORATE REPORTS AND INVESTIGATIVE STUDIES

<u>Design</u>
Machine design employing the multi-disciplined areas of ergonomics, materials and dynamic stress analysis to obtain minimum risk configurations.

<u>Accident Reconstruction</u>
Analyzing numerous industrial, traffic, aircraft and structural accidents employing the principles of advanced dynamics and modern investigative engineering techniques.

<u>Industrial Machine Design</u>
Evaluation of restraint systems and operator stations for industrial equipment from the biomechanical and ergonomic standpoints employing anthropometric test devices (ATD).

<u>Intellectual Property</u>
Evaluation of numerous components, apparatus or machines for infringement or non-infringement of various patents.

Turbine/Generator Rotor Reliability Analysis
Probabilistic fracture mechanics, computerized finite element methods, empirical temperature data and practical experience incorporated to provide a criterion from which major utility companies may engage in an appropriate run-retire decision making process.

Fatigue Analysis
In-field strain histograms, material properties and simulated tests incorporated to determine the fatigue life of structural components. Suggestive alternative designs were presented to provide longer fatigue life in typical fatigue service applications.

Fracture Analysis
Determine cause of structural component fracture in the following disciplines: fatigue, brittle fracture, structural overload, corrosion, creep, etc.

Structural Analysis
Evaluate through analytical and experimental techniques the adequacy of various mechanical configurations designed for static load carrying capacity.

Material Properties
Evaluation of metallic, polymer, and ceramic material parameters such as modulus, hardness, fracture toughness, crack growth rate, strain-life curves for fatigue, creep properties, true/engineering stress strain curves for material selection purposes in commercial machine design and sporting goods applications.

PUBLICATIONS

"TURBINE ROTOR RELIABILITY: A PROBABILITY MODEL FOR BRITTLE FRACTURE"
Authors: E. M. Caulfield, M.T. Cronin, W. B. Fairley, N.E. Rallis
Published by Society for Risk Analysis, Proceedings 1983, Annual Meeting 1983.

"AN APPROACH TO RELIABILITY ANALYSIS OF CRACKED CONTINUOUS DIGESTERS"
Authors: E. M. Caulfield, C. R. Morin, J. E. Slater
Published by NACE (National Association of Corrosion Engineers), Houston, TX, March 1982.

"ROTOR RELIABILITY ASSESSMENT IN THE ELECTRIC POWER INDUSTRY"
Authors: E. M. Caulfield, M. T. Cronin
Published by Edison Electric Institute (The Association of Electric Companies) at 9th Annual Engineering Conference on Reliability, Hershey, PA, June 1982.

"AN INVESTIGATION OF STRESS-DEPENDENT; TEMPERATURE-DEPENDENT; AND TIME-DEPENDENT STRAINS IN RANDOMLY ORIENTED FIBER REINFORCED COMPOSITES"

Author: E. M. Caulfield

Published by ASTM (American Society for Testing and Materials) Philadelphia, PA, 1982, Chapter - Short Fiber Reinforced Composite Materials, ASTM STP 772.

"AN INVESTIGATION OF STRESS, TEMPERATURE, AND TIME DEPENDENT STRAINS IN A RANDOMLY ORIENTED FIBER REINFORCED COMPOSITE WITH SPECIAL EMPHASIS GIVEN TO THERMAL STRESS SITUATION"

Author: E. M. Caulfield

Published by University of IL, Urbana, IL, T&AM Report No. 432, December 1978.

"FUNDAMENTALS OF MODERN FATIGUE ANALYSIS"

Authors: D. F. Socie, M.R. Mitchell, E.M. Caulfield

Published by University of IL, Urbana, IL, FCP Report No. 26, April 1977, Revised December 1979.

"FRACTURE MECHANICS PARAMETERS OF A-27 CAST STEEL"

Author: E. M. Caulfield

Published by University of IL, Urbana, IL, FCP Report No. 28, December 1977.

SEMINARS AND PRESENTATIONS

"Productivity in Modern Heat Treating Practices," Northern Illinois Heat Treaters Association, Rockford, IL, April 1980.

"Modern Fatigue Analysis," ASM Chicago-Western Chapter, April 1980.

"Technical Aspects of Modern Failure Analysis," Westec Conference, Los Angeles, CA, March 1980.

"Temperature, Stress and Time Dependent Strains in Fiber Reinforced Polymers," ASTM Conference, Minneapolis, MN, March 1980.

"Modern Fatigue Analysis," National Water Lift, Kalamazoo, MI, March 1979.

"Thermal Stress Computations for Materials with Highly Varying Modulii over Temperature," Stellite Corporation, Division of Cabot. Kokomo, IN, December 1978.

"Fracture Toughness Properties of A-27 Cast Stee,l" University of Illinois, November 1978.

"Fundamentals of Modern Fatigue Analysis", Structural Dynamics Research Corporation, Cincinnati, OH, January 1977; Cincinnati, OH, June 1977; Chicago, IL, December 1977; Cincinnati, OH, June 1978.

"Fundamentals of Modern Fatigue Analysis," University of Illinois, January 1977; June 1977; January 1978; June 1978.

"Modern Fatigue Analysis," General Motors Proving Ground, Milford, MI, August 1977.

"Refresher Course for 'Engineer in Training' in State of Illinois," University of Illinois, Spring, Fall, 1973, 1974, 1975, 1977. Sponsored by A.S. C. E. Student Chapter.

"Strain Components in Glass Fiber Reinforced Composites," University of Illinois, September 1976.

"Theory and Applications of Fracture Mechanics," Marion Power Shovel Company, Marion, OH, June 1975.

"Fracture Mechanics Parameters of A-27 Cast Steel," Clark Equipment Company, Niles, MI, June 1975.

"Introduction to Fracture Mechanics," Rexnord Corporation, Milwaukee, WI, June 1975.

Edward M. Caulfield, Ph.D., P.E
Testimony Record

December 10, 2002, Atlanta, GA
Haun (Michael David, et al v Ford Motor Company)
Case No.: 2:01-2238-18
Law Firm: Nelson Mullins Riley & Scarborough, Columbia, SC
Deposition Testimony

December 18, 2002, Wheaton, IL
McSweegan (Kevin) v. The Raymond Corporation
Case No.: CV-99-0593206-S
Law Firm: Day, Berry & Howard, Hartford, CT
Deposition Testimony

January 10, 2003, Chicago, IL
Eaton Corporation v. Parker Hannifin Corporation
Case No.: C.A. No. 00-751-SLR
Law Firm: Ross & Hardies, Chicago, IL
Deposition Testimony

January 15, 2003, Naperville, IL (telephonic)
Royas (Albert E.) V. Mercedes Benz, USA, Inc.; Daimler Chrysler AG; Behr Climate Control; and Does 1-50, Inclusive
Case No.: BC223738
Law Firm: Carroll Burdick & McDonough
Deposition Testimony (Vol. II)

January 28-29, 2003, Los Angeles, CA
Royas (Albert E.) V. Mercedes Benz, USA, Inc.; Daimler Chrysler AG; Behr Climate Control; and Does 1-50, Inclusive
Case No.: BC223738
Law Firm: Carroll Burdick & McDonough
Trial Testimony

February 4-5, 2003, Wilmington, Delaware
Eaton Corporation v. Parker Hannifin Corporation
Case No.: C.A. No. 00-751-SLR
Law Firm: Ross & Hardies, Chicago, IL
Trial Testimony

February 19, 2003, Lisle, IL
Cunningham (George) v Case Corporation et al.
Case No.: CA 94-RCCV-222
Law Firm: Nelson Mullins Riley & Scarborough, Atlanta, GA
Deposition Testimony

February 28, 2003, Chicago, IL
Romero (Jesus and Fabiana) vs. Walt Disney World Hospitality & Recreation Corporation
Case No.: CI198-7768
Law Firm: Cabaniss, Smith, Toole & Wiggins, Maitland, FL
Deposition Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

March 3, 2003, Naperville, IL
Redding (Kaye) and Drew and Jacob v Ford Motor Company, TRW Vehicle Safey System, Inc., Lindeberger Chevrolet, Inc. and Action Ford-Mercury, Inc.
Case No.: 00CPI60690
Law Firm: Nelson Mullins Riley & Scarborough, Columbia, SC
Deposition Testimony

March 11, 2003, Rosemont, IL
Hirn (Ronald Allan) et al v. Land Rover U.K. Ltd., Land Rover N.A. Inc., Continental General Tire, Inc., The Tire Corral Inc., Gunn Infinity d/b/a Gunn Range Rover
Case No.: 28,564-A
Law Firm: Wheeler Trigg & Kennedy P.C., Denver, CO
Deposition Testimony

May 30, 2003, Wheaton, IL
Collins (Stephanie) vs. Ford Motor Company; West Colton Cars, Inc. D/B/A Redlands Ford; Michael Loren Butler; and Does 1 through 50, inclusive
Case No.: RIC361201
Law Firm: Snell and Wilmer, Irvine, CA
Deposition Testimony

June 18, 2003, Burr Ridge, IL
Hopper (Mary Jane and Harrison) v. David Leon Baldwin, Nissan North America, Inc. and Nissan Motor Co., Ltd.,
Case No. 99-6596-CI-21
Law Firm: Rumberger, Kirk & Caldwell, P.A., Orlando, FL
Deposition Testimony

July 23, 2003, Wheaton, IL
Anderson (Craig A. and Christina L. Palomo-Anderson), et al vs. ABC Insurance Company, Raymond Corporation, DEF Insurance Company, Stoffel Equipment Company, Inc.
Case No. 02-CV-3113
Law Firm: Quarles & Brady, LLP, Milwaukee, WI
Deposition Testimony

July 24-25, 2003, Naperville, IL
Vulcan Litigation April 2001 Incidents
Case No. 69,388-A
Law Firm: Quarles & Brady, Milwaukee, WI
Deposition Testimony

August 7, 2003, Chicago, IL
Kinzenbaw (Jon) et al. vs. Case LLC, et al.
Case No. C01-133MJM
Law Firm: McGuire Woods Ross & Hardies, Chicago, IL
Deposition Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

September 3, 2003, Wheaton, IL
Donald (Christopher S.), Jimmy Donald and Sherry Donald,
as Legal Guardians for Christopher S. Donald, and Matthew Lake
Case No. Civil Action No. 1:01CV408-JAD
Law Firm: Watkins & Eager PLLC, Jackson, MS
Deposition Testimony

September 5, 2003, Chicago, IL
Gibson (Artumus) Jr. as Surviving Spouse of
Anne Marie Gibson, Deceased, and Artumus G. Gibson, Jr., as
Administrator of the Estate of Anne Marie Gibson, Deceased v.
Ford Motor Company, Draw-Tite, Inc., and William M. Burns, III
Case No. Civil Action No. ST-00-CV-0111
Law Firm: McGuire Woods Ross & Hardies, Richmond, VA
Deposition Testimony

September 8, 2003, Wheaton, IL
Winn Incorporated and
Ben Huang v. Eaton Corporation
Case No. CV-03-1568 SJO
Law Firm: Sughrue Mion Zinn et al, Washington DC
Deposition Testimony

September 16, 2003, Naperville, IL
Canfield (Jacob) and Elizabeth Canfield v.
Ford Motor Company
Case No. 02CV211111, Division 16
Law Firm: Shook, Hardy & Bacon LLP, Kansas City, MO
Deposition Testimony

September 23, 2003, Chicago, IL
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Deposition Testimony

September 26, 2003, Wheaton, IL
Adams (Pamela) v. Key Ford, Inc. and
Ford Motor Company
Case No. 98-1000-CA-01 (Div. B)
Law Firm: Cabaniss, Smith, Toole & Wiggins, Maitland, FL
Deposition Testimony

October 20, 2003, Cedar Rapids, IA
Kinzenbaw (Jon) et al. vs. Case LLC, et al.
Case No. C01-133MJM
Law Firm: McGuire Woods Ross & Hardies, Chicago, IL
Hearing Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

October 21, 2003. Kansas City, MO
Canfield (Jacob) and Elizabeth Canfield v.
Ford Motor Company
Case No. 02CV211111, Division 16
Law Firm: Shook, Hardy & Bacon LLP, Kansas City, MO
Trial Testimony

October 29, 2003, Aurora, IL
Hopper (Mary Jane and Harrison) v. David Leon Baldwin,
Nissan North America, Inc. and Nissan Motor Co., Ltd.,
Case No. 99-6596-CI-21
Law Firm: Rumberger, Kirk & Caldwell, P.A., Orlando, FL
Deposition Testimony (Supplemental)

October 30, 2003, Chicago, IL
Mathes (John) father of Jacob Mathes and son of John Mathes
and Shirley Mathes v. Sher Express LLC, Sentry Select Insurance Company
(Formerly known as John Deere Insurance Company), Ford Motor Company,
a Delaware Corporation, Festus Ford, Inc., a Delaware Corporation
and PlayMor Trailers, Inc.
Case No. 02 CV 204007
Law Firm: Shook Hardy and Bacon, Kansas City, MO
Deposition Testimony

November 12, 2003, Clearwater, FL
Hopper (Mary Jane and Harrison) v. David Leon Baldwin,
Nissan North America, Inc. and Nissan Motor Co., Ltd.,
Case No. 99-6596-CI-21
Law Firm: Rumberger, Kirk & Caldwell, P.A., Orlando, FL
Hearing

November 19, 2003, Chicago, IL
Pollesche, Leslie and Daniel on behalf of Danielle
Pollesche, a minor, and as surviving parent of
Cassandra Pollesche, deceased; Wesley T. Nixon;
Nena Clark on behalf of Cherise Clark, a minor v.
Ford Motor Company, Bell Ford, Inc., Xavier Ramirez,
Jane Doe Ramirez, and John Does I-X
Case No. CV2000-011238
Law Firm: Snell and Wilmer, Phoenix, AZ
Deposition Testimony

November 24, 2003, Wheaton, IL
Gonzalez (Alfonso Jr.), Valdez (Noemi), Chavarria (Noemi),]
Valdez (Rosa), Tijerina (Brenda), Tinajero (Elizabeth)
et al v. Ford Motor Company, Recio Auto Sales,
And the estate of Richard Alaniz, Jr.
Case No. DC-02-3332
Law Firm: McGuire Woods, Richmond, VA
Deposition Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

January 13, 2004, Wheaton, IL
McCoy (Robert Edward) vs. American Honda Motor Co., Inc.,
Honda Motor Company, LTD and Charles E. Jones
Civil Action No.: 2001-CP-23-7483
Law Firm: Nelson Mullins Riley & Scarborough LLP
Deposition Testimony

January 28, 2004, Greenville, SC
McCoy (Robert Edward) vs. American Honda Motor Co., Inc.,
Honda Motor Company, LTD and Charles E. Jones
Civil Action No.: 2001-CP-23-7483
Law Firm: Nelson Mullins Riley & Scarborough LLP
Trial Testimony

February 13, 2004, Los Angeles, CA
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Supplemental Deposition Testimony

February 17-18, 2004, Los Angeles, CA
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Trial Testimony

February 24, 2004, Los Angeles, CA
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Supplemental Deposition Testimony

February 25, 2004, Los Angeles, CA
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Trial Testimony

March 1, 2004, Independence, MO
Mathes (John) father of Jacob Mathes and son of John Mathes
and Shirley Mathes v. Sher Express LLC, Sentry Select Insurance Company
(Formerly known as John Deere Insurance Company), Ford Motor Company,
a Delaware Corporation, Festus Ford, Inc., a Delaware Corporation
and PlayMor Trailers, Inc.
Case No. 02 CV 204007
Law Firm: Shook Hardy and Bacon, Kansas City, MO
Trial Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

April 12&14, 2004, Wheaton, IL
Jason and Suzie Schechterle, et al v. Ford Motor Company;
Lou Grubb Ford LLC; Xecore Corporation; et al.
Case No. CV2003-003427
Law Firm: Dykema Gossett, Bloomfield Hills, MI
Deposition Testimony

June 3, 2004, San Francisco, CA
Jarvis (Maria) individually and as personal representative
of the Estate of Dennis B. Jarvis; the Estate of Dennis B. Jarvis;
Carrie Ann Faraone; and James Pirnik, v. Audi AG et. al.,
Volkswagon of America; Volkswagenwek; Audi of America;
Marc James Naify d/b/a J&L Auto Repair; and Does 1 through 50
Case No. CIV428481
Law Firm: Carroll Burdick & McDonough, LLP, San Francisco, CA
Deposition Testimony

June 15, 2004, Wheaton, IL
Smith, Yvonne H. et al. v. Helena J. Cangieter et al.
Case No. 00-4045-CV-C-66BA
Law Firm: Polsinelli, Shalton, Welte, Suelthaus PC
Deposition Testimony

June 21, 2004, Oakbrook Terrace, IL
Strickland (Zachary) v Ford Motor Company
Case No. 4:00-1391-25
Law Firm: McGuire Woods, Richmond, VA
Deposition Testimony

July 9, 2004, Bloomingdale, IL
Phillips (Sammie) v The Raymond Corporation
Case No. 99 C 2152
Law Firm: Swanson Martin & Bell, Chicago, IL
Deposition Testimony

July 12, 2004, Lisle, IL
St. Clair County, et al. v. Ford Motor Company, et al.
Case No. 03-L-115
Law Firm: Dykema Gossett, PLLC, Bloomfield Hills, MI
Deposition Testimony

July 16, 2004, Wheaton, IL
Wheeler (Randy Eugene) v. Ben Satcher Motors, Inc.,
and Ford Motor Company, Inc.
Case No. 01-CP-32-0656
Law Firm: Cabaniss Smith Toole & Wiggins PL, Maitland, FL
Deposition Testimony

August 10-11, 2004, Chicago, IL
Automated Mechanical Transmission Systems
for Medium-Duty and Heavy-Duty Trucks of
Components Thereof
Investigation No. 337-TA-503 (U.S. Int'l Trade Commission, Wash. DC)

Edward M. Caulfield, Ph.D., P.E
Testimony Record

Law Firm: Sughrue Mion PLLC, Washington DC
Deposition Testimony
August 25, 2004, Chicago, IL
Kinzenbaw (Jon) et al. vs. Case LLC, et al.
Case No. C01-133MJM
Law Firm: McGuire Woods, Chicago, IL
Deposition Testimony

September 7-9, 2004, Washington D.C.
Automated Mechanical Transmission Systems
for Medium-Duty and Heavy-Duty Trucks of
Components Thereof
Investigation No. 337-TA-503 (U.S. Int'l Trade Commission, Wash. DC)
Law Firm: Sughrue Mion PLLC, Washington DC
Trial Testimony

September 15, 2004, Washington D.C.
Automated Mechanical Transmission Systems
for Medium-Duty and Heavy-Duty Trucks of
Components Thereof
Investigation No. 337-TA-503 (U.S. Int'l Trade Commission, Wash. DC)
Law Firm: Sughrue Mion PLLC, Washington DC
Trial Testimony (Rebuttal)

September 24, 2004, Rosemont, IL
Hardy (Richard M.) V. U.S. Foodservice, Inc., formerly
PYA/Monarch, Inc., a Corporation, The Raymond Corporation,
a corporation, et al.
Case No. CV-02-1239-R
Law Firm: Lightfoot Franklin & White LLC, Birmingham, AL
Deposition Testimony

September 29, 2004, Naperville, IL
Sears, Roebuck and Co., a New York Corporation,
and Alfredo E. Jijon, Third-Party Plaintiffs, v.
Charwil Associates Limited Partnership; Acceptance
Insurance Company Travelers Casualty and Surety
Company, f/k/a Aetna Casualty and Surety Company and
Rosa L. Kresin
Deposition Testimony

October 12, 2004, Redwood City, CA
Jarvis (Maria) individually and as personal representative
of the Estate of Dennis B. Jarvis; the Estate of Dennis B. Jarvis;
Carrie Ann Faraone; and James Pirnik, v. Audi AG et. al.,
Volkswagon of America; Volkswagenwek; Audi of America;
Marc James Naify d/b/a J&L Auto Repair; and Does 1 through 50
Case No. CIV428481
Law Firm: Carroll Burdick & McDonough, LLP, San Francisco, CA
Trial Testimony

October 14, 2004, Bellville, IL
St. Clair County, et al. v. Ford Motor Company, et al.
Case No. 03-L-115
Law Firm: Dykema Gossett, PLLC, Bloomfield Hills, MI

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Testimony Record

Trial Testimony

October 15, 2004, St. Louis, MO
Galvan (Cruz Macias), individually and on behalf of the estate of
Sergio Alberto Macias, deceased and Victorino Quiroga as
next friend of Diego A. Quiroga, a minor v. David Garcia,
Mercedes Garcia, Rodriguez Ford-Mercury, Inc.,
Ford Motor Company, and TRW Vehicle Safety Systems, Inc.
Case No. 2002-04-1485-B
Law Firm: Snell & Wilmer L.L.P., Tucson, AZ
Deposition Testimony

November 22-23, 2004, Cedar Rapids, IA
Kinzenbaw (Jon) et al. vs. Case LLC, et al.
Case No. C01-133MJM
Law Firm: McGuire Woods, Chicago, IL
Trial Testimony

December 7, 2004, Wheaton, IL
Deno (Joshua) v Ford Motor Company
Case No. 96-CI-00293
Law Firm: Baker Donelson, Nashville, TN
Deposition Testimony

December 28, 2004, Naperville, IL
Coleman (Sandra) as Personal Representative of
The Wrongful Death Beneficiaries of Randy Coleman,
Deceased vs. Ford Motor Company, Premier Ford
Lincoln-Mercury, Inc.; Mary Ruth Shelton, as
Administratrix of the Estate of Janice Hudson, Deceased
Civil Action No. 2002-0209-CV-1
Law Firm: McGuire Woods, Richmond, VA
Deposition Testimony

January 4, 2005, Chicago, IL
Jablonksi (Dora Mae) and John L. Jablonski, Jr. As
Special Administrator and Personal Representative
Of the Estate of John L. Jablonski, Sr. vs. Ford
Motor Company and Natalie S. Ingram
Case No.: 03-L-2027
Law Firm: Dykema Gossett, Bloomfield Hills, MI
Deposition Testimony

January 7, 2005, Wheaton, IL
Lee (Jenny and Changshi) et al. v Nissan Motor Company et al.
Case No. 012-08476
Law Firm: Sandberg, Phoenix & von Gontard, St. Louis, MO
Deposition Testimony

January 18, 2005, Philadelphia, PA
Ortiz (Daniel) v Yale Materials Handling Corporation,
Hyster-Yale Materials Handling, Inc., and
John Doe Manufacturer
Case No. 03-CV-3657

Edward M. Caulfield, Ph.D., P.E
Testimony Record

Law Firm: Lavin O'Neill Ricci Cedrone & DiSipio, Philadelphia, PA
Deposition Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

January 20, 2005, Knoxville, TN
Teets (Linda B.) et al vs. Millennium Trucking, Inc., et al.,
Defendant and Third-Party Plaintiff vs. Ford Motor Company,
Third Party Defendant
Case No. 3:01-CV-415
Trial Testimony

February 8, 2005, Wheaton, IL
Jablonksi (Dora Mae) and John L. Jablonski, Jr. As
Special Administrator and Personal Representative
Of the Estate of John L. Jablonski, Sr. vs. Ford
Motor Company and Natalie S. Ingram
Case No.: 03-L-2027
Law Firm: Dykema Gossett, Bloomfield Hills, MI
Deposition Testimony (Vol. II)

February 25, 2005, Wheaton, IL
Freedle (Steven L.) vs. Ford Motor Company,
Cerbat Hills Ford Lincoln Mercury, LLC d/b/a
Colorado River Ford, et al.
Deposition Testimony

March 3, 2005, Beaver Dam, KY
Deno (Joshua) v Ford Motor Company
Case No. 96-CI-00293
Law Firm: Baker Donelson, Nashville, TN
Trial Testimony

March 18, 2005, Florence, SC
Strickland (Zachary) v Ford Motor Company
Case No. 4:00-1391-25
Law Firm: McGuire Woods, Richmond, VA
Trial Testimony

March 21, 2005, Florence, SC
Strickland (Zachary) v Ford Motor Company
Case No. 4:00-1391-25
Law Firm: McGuire Woods, Richmond, VA
Trial Testimony (continued)

March 25, 2005, Chicago, IL
Newton (Shonnie) et al. v. Ford Motor Company et al.
Nolte (Michael and Barbie) v. Ford Motor Company and
Trade Winds Distributing, Inc.
Case No. 03CV215677
Law Firm: Dykema Gossett, Bloomfield Hills, MI
Deposition Testimony

April 18, 2005, Edwardsville, MO
Jablonksi (Dora Mae) and John L. Jablonski, Jr. As
Special Administrator and Personal Representative
Of the Estate of John L. Jablonski, Sr. vs. Ford
Motor Company and Natalie S. Ingram
Case No.: 03-L-2027
Law Firm: Dykema Gossett, Bloomfield Hills, MI

Edward M. Caulfield, Ph.D., P.E
Testimony Record

Trial Testimony
May 3, 2005, Chicago, IL
Chevez, Martha et al v. Ford Motor Company,
Jojet Viray Pilao, Sotero Pilao, Fermin Rovira; and
Does 1 to 200
Case No. EC032707
Law Firm: Bowman and Brooke, Minneapolis, MN
Deposition (Supplemental) Testimony

June 1, 2005, Chicago, IL
Smith (Micky) and J. Scott Brown as representatives
of the Estate of Elizabeth Ashley Smith, Deceased
and the Estate of Noah Scott Smith, Deceased;
and J. Scott Brown as representative of the Estate
of Thomas Ashton Brown, Deceased, Plaintiffs, and
Marcus Allen Austin, Executor of the Estates of Milton
Andrew Austin and Thelma Susie Austin, Intervenors-
Plaintiffs v. Ford Motor Company; Reynolds Ford, Inc.;
And Five Star Ford, Inc.
Case No. CJ-2004-59
Law Firm: Eldridge Cooper Steichen & Leach, Tulsa, OK
Deposition Testimony

June 8, 2005, Kansas City, MO
Newton (Shonnie) et al. v. Ford Motor Company et al.
Nolte (Michael and Barbie) v. Ford Motor Company and
Trade Winds Distributing, Inc.
Case No. 03CV215677
Law Firm: Dykema Gossett, Bloomfield Hills, MI
Trial Testimony

July 6, 2005, Oakbrook Terrace, IL
Frede (Alicia and Jason) v Bridgestone/Firestone, Inc.;
Ford Motor Company; Pundmann Motor Company
Case No. 022-09936
Law Firm: Snell & Wilmer, Phoenix, AZ
Deposition Testimony

July 21, 2005, Naperville, IL
Eldridge, Savannah Georgia and David Eldridge,
as Personal Representative of the Estate of
Matthew Eldridge, Plaintiffs v. The Estate of
Robert J. Moore II, Deceased and 3CI Complete
Compliance Corporation d/b/a American 3CI,
Ford Motor Company and Taggart Motor Company,
Defendants
Case No. 03-5-12120
Law Firm: Prichard Hawkins McFarland and Young, San Antonio, TX
Deposition Testimony

August 9, 2005, Lisle, IL
Caudill (Ronald and Jewell) parents and next friends of
Jacob Caudill, a minor v. Amy Lea Sunday and Ford Motor Company
Case No. CJ-2002-070
Law Firm: Shook Hardy & Bacon, Kansas City, MO

Edward M. Caulfield, Ph.D., P.E
Testimony Record

Deposition Testimony

August 22, 2005, Pensacola, FL
Adams (Pamela) v. Key Ford, Inc. and
Ford Motor Company
Case No. 98-1000-CA-01 (Div. B)
Law Firm: Cabaniss, Smith, Toole & Wiggins, Maitland, FL
Trial Testimony

September 1, 2005, Norman, OK
Smith (Micky) and J. Scott Brown as representatives
of the Estate of Elizabeth Ashley Smith, Deceased
and the Estate of Noah Scott Smith, Deceased;
and J. Scott Brown as representative of the Estate
of Thomas Ashton Brown, Deceased, Plaintiffs, and
Marcus Allen Austin, Executor of the Estates of Milton
Andrew Austin and Thelma Susie Austin, Intervenors-
Plaintiffs v. Ford Motor Company; Reynolds Ford, Inc.;
And Five Star Ford, Inc.
Case No. CJ-2004-59
Law Firm: Eldridge Cooper Steichen & Leach, Tulsa, OK
Trial Testimony

September 7, 2005, Norman, OK
Smith (Micky) and J. Scott Brown as representatives
of the Estate of Elizabeth Ashley Smith, Deceased
and the Estate of Noah Scott Smith, Deceased;
and J. Scott Brown as representative of the Estate
of Thomas Ashton Brown, Deceased, Plaintiffs, and
Marcus Allen Austin, Executor of the Estates of Milton
Andrew Austin and Thelma Susie Austin, Intervenors-
Plaintiffs v. Ford Motor Company; Reynolds Ford, Inc.;
And Five Star Ford, Inc.
Case No. CJ-2004-59
Law Firm: Eldridge Cooper Steichen & Leach, Tulsa, OK
Trial Testimony (Rebuttal)

September 21, 2005, Bristow, OK
Caudill (Ronald and Jewell) parents and next friends of
Jacob Caudill, a minor v. Amy Lea Sunday and Ford Motor Company
Case No. CJ-2002-070
Law Firm: Shook Hardy & Bacon, Kansas City, MO
Trial Testimony

September 23, 2005, Chicago, IL
Certain Automated Mechanical Transmission Systems for
Medium-Duty and Heavy-Duty Trucks and Components
Thereof
Case No.: U.S. International Trade Commission Investigation No. 337-TA-503
Law Firm: Sughrue Mion PLLC, Washington DC
Deposition Testimony

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Testimony Record

September 25, 2005, Naperville, IL
Jenkins (Johnny Darryl) vs. Ford Motor Company, et al.
Jenkins (Paula Knight) vs. Ford Motor Company, et al.
Case No.: CV-04-114
Law Firm: Huie, Fernambucq & Stewart, Birmingham, AL
Deposition Testimony

September 29, 2005, Montgomery, AL
Hardy (Richard M.) V. U.S. Foodservice, Inc., formerly
PYA/Monarch, Inc., a Corporation, The Raymond Corporation,
a corporation, et al.
Case No. CV-02-1239-R
Law Firm: Lightfoot Franklin & White LLC, Birmingham, AL
Trial Testimony

October 3, 2005, Washington DC
Paice LLC vs. Toyota Motor Corporation,
Toyota Motor North America, Inc., and
Toyota Motor Sales USA, Inc.
Case No. 2-04CV-211 (DF)
Law Firm: Kenyon & Kenyon, Washington DC
Deposition Testimony

October 7, 2005, Washington DC
Certain Automated Mechanical Transmission Systems for
Medium-Duty and Heavy-Duty Trucks and Components
Thereof
Case No.: U.S. International Trade Commission Investigation No. 337-TA-503
Law Firm: Sughrue Mion PLLC, Washington DC
Trial Testimony

October 21, 2005, Lisle, IL
Howell, et al v. Ford Motor Company
Case No.: 04 CVS 107
Law Firm: Dykema Gossett, PLLC, Bloomfield Hills, MI
Deposition Testimony

November 15, 2005, Wheaton, IL
Korpela-Jorgenson (Dylan), C.M. Bye, Linda Jorgenson,
And Kids Care of Michigan v. Ford Motor Company, and
Samantha Elliott
Case No.: 04-CV-306
Law Firm: Donohue, Brown, Mathewson & Smyth, Chicago, IL
Deposition Testimony

November 28, 2005, Chicago, IL
Metzger (Leo A.) v. CNH America LLC, et al
Case No. 04C50446
Law Firm: Sughrue Mion PLLC, Washington DC
Deposition Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

December 5, 2005, York, PA
Keller (Christine) v The Raymond Corporation and
Pengate Handling Systems, Inc.
Case No. 97-SU-03400-01
Law Firm: Lavin, O'Neil Ricci Cedrone & DiSipio, Philadelphia, PA
Trial Testimony

December 6, 2005, Athens, GA
Gibson (Artumus) Jr. as Surviving Spouse of
Anne Marie Gibson, Deceased, and Artumus G. Gibson, Jr., as
Administrator of the Estate of Anne Marie Gibson, Deceased v.
Ford Motor Company, Draw-Tite, Inc., and William M. Burns, III
Case No. Civil Action No. ST-00-CV-0111
Law Firm: McGuire Woods Ross & Hardies, Richmond, VA
Trial Testimony

December 15-16, 2005, Marshall, TX
Paice LLC vs. Toyota Motor Corporation,
Toyota Motor North America, Inc., and
Toyota Motor Sales USA, Inc.
Case No. 2-04CV-211 (DF)
Law Firm: Kenyon & Kenyon, Washington DC
Trial Testimony

December 28, 2005, Chicago, IL
Williams (Shanti) as Personal Representative of the Estate
Of Roneshea Knight, deceased, Plaintiff, vs.
The General Tire and Rubber Company, a foreign corporation,
Continental Tire North America, Inc., a foreign corporation
formerly known as General Tire, Inc., ("CTNA"), Century
Products, Graco Children's Products, Inc., a foreign
corporation, f/k/a Century Car Seats and Car Credit,
a Florida corporation, and Sears Roebuck and Company, a
Foreign corporation, Defendants.
Pilcher (Lloyd) Plaintiff, vs. Gencorp, Inc., a foreign corporation,
The General Tire and Rubber Company, a foreign corporation,
Continental Tire North America, Inc., a foreign corporation
formerly known as General Tire, Inc., Car Credit, a Florida
Corporation, and Sears Roebuck and Company, a foreign
Corporation, Defendants.
Case No.: 04-2824
Law Firm: Arnstein & Lehr, West Palm Beach, FL
Deposition Testimony

January 10, 2006, Warrenville, IL
Felipe (Julian) v Ford Motor Company, Inc., a Delaware Corporation;
And Seagate Auto Brokers, Inc., a Florida Corporation
Case No. 04-3864 CA 04
Law Firm: Carlton Fields, P.A., Miami, Florida
Deposition Testimony

January 19, 2006, Rosemont, IL
Bynum (William D.) and Carolyn v. Ford Motor Company, et al.
Case No. CV-2001-202-CV12
Law Firm: Cabaniss, Smith, Toole & Wiggins, Maitland, FL

Edward M. Caulfield, Ph.D., P.E
Testimony Record

Deposition Testimony
February 9, 2006, New York City, NY
Adams (Walter) v. Richard Rathe, Robert Rathe,
Genie Industries, Inc., and Genie Industries, Inc.
Case No. 116382/00
Law Firm: Wilson, Elser, Moskowitz, Edelman
& Dicker LLP, White Plains, NY
Trial Testimony

February 17, 2006, Downers Grove, IL
Clayton (Dee) et al v Utah Auto Collections,
Warner Super Ford Store, Ford Motor Company
Case No. 000909522
Law Firm: Snell & Wilmer, Salt Lake City, UT
Deposition Testimony

March 7, 2006, Chicago, IL
Torres (Tania Cameal), Individually, and as
Administratrix of the Estate of Ricardo Torres,
Deceased, Plaintiff, v. Ford Motor Company,
TRW, Inc., TRW Vehicle Safety Systems, Inc.,
Boomershine Ford, Inc., and Atlanta/Southern Gold, Inc.,
d/b/a Southern Comfort Restaurant & Lounge
Case No.: 00VS-008220-H
Law Firm: McKenna, Long & Aldridge, Atlanta, GA
Deposition Testimony

March 22, 2006, Wheaton, IL
Dewinne (Rene B. Jr.), Plaintiff v.
The Raymond Corporation, N.J. Malin Holding, Inc., and
Home Depot, USA, Defendant
Case No.: GN 401898
Law Firm: Fulbright & Jaworski, San Antonio, TX
Deposition Testimony

May 4, 2006, Naperville, IL
Knuckles (Hattie), as Guardian Ad Litem for Robert H. Knuckles,
And Individually, Plaintiffs, v. Toyota Motor Corporation,
Toyota Motor Sales USA, Inc., Tokai Rika Co. Ltd., and
Signal Imports, Inc., Defendants
Case No. 2004-CP-42-201
Case No. 2004-CP-42-200
Law Firm: Nelson Mullins Riley & Scarborough, Atlanta, GA
Deposition Testimony

May 16, 2006, Chicago, IL
Eaton Corporation, Plaintiff, v.
ZF Meritor LLC, Arvinmeritor, Inc. and
ZF Friedrichshafen AG, Defendants
Case No. 03-74844
Law Firm: Sughrue Mion Zinn et. al., Washington DC
Deposition Testimony

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Testimony Record

May 24, 2006, Chicago, IL
Eaton Corporation, Plaintiff, v.
ZF Meritor LLC, Arvinmeritor, Inc. and
ZF Friedrichshafen AG, Defendants
Case No. 03-74844
Law Firm: Sughrue Mion Zinn et. al., Washington DC
Deposition Testimony (continued)

May 26, 2006, Los Angeles, CA
Delloro (Winfred and Celina), Plaintiffs, vs.
Enterprise Rent-A-Car of Los Angeles, a Nevada Corporation, et al.
(General Motors)
Case No. BC328314
Law Firm: Dykema Gossett, LLP, Los Angeles, CA
Deposition Testimony

June 7, 2006, Lisle, IL
Early (David), Administrator of the Estate of
Joshua Early, Deceased and Karen Mullins,
Administratix of the Estate of Timothy Mullins,
Deceased
Case No. 3:04-CV-251-5
Law Firm: Woodward Hobson & Fulton LLP, Louisville, KY
Deposition Testimony

June 30, 2006, Aurora, IL
Dolan (Kathleen), Individually and as
Personal Representative of the Estate
Of Mary Anne Torpey, Deceased,
Joan Gorman, Bonnie Polt, Individually
And as Next Friend of Glen Polt, Jr.,
Glen Polt and Kristin Polt, Plaintiffs,
v. Ford Motor Company, Inc., Jerome Duncan
(Ford Dealership) and Peggy Thompson,
Defendants
Case No. 04-3074-N1
Law Firm: Bowman and Brooke, Minneapolis, MN

August 9, 2006, Los Angeles, CA
Delloro (Winfred and Celina), Plaintiffs, vs.
Enterprise Rent-A-Car of Los Angeles, a Nevada Corporation, et al.
(Michelin North America Inc.)
Case No. BC328314
Law Firm: Yukevich Calfo & Cavanaugh, Los Angeles, CA
Trial Testimony

August 29, 2006, Washington DC
Eaton Corporation, Plaintiff, v.
ZF Meritor LLC, Arvinmeritor, Inc. and
ZF Friedrichshafen AG, Defendants
Case No. 03-74844
Law Firm: Sughrue Mion Zinn et. al., Washington DC
Hearing Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

September 12, 2006, Wheaton, IL
Borsack (Ronald), Individually and as Administrator of
The Estate of Lesley Borsack, Plaintiff, against
Ford Motor Company, a Delaware Corporation,
Defendant
Case No. 04-CV-3255
Law Firm: Aaronson, Rappaport, Feinstein & Deutsch, LLP, New York NY
Deposition Testimony

September 14, 2006, Irvine, CA
Justice (Gloria), Plaintiff, vs. Clark County Airlife,
Ford Motor Company, etc., et al., Defendants
Case No. BCV 06005
Law Firm: Snell & Wilmer, Costa Mesa, CA
Deposition Testimony

September 22, 2006, Wheaton, IL
Allison (Shannon) et al v. Ford Motor Company
Case No. CV-2005-668
Law Firm: Snell and Wilmer, Salt Lake City, UT
Deposition Testimony

October 19-20, 2006, Lisle, IL
Certain Combination Motor and Transmission
Systems and Devices Used Therein, and
Products Containing the Same
(Solomon Technologies v Toyota Motor Corporation),
U.S. International Trade Commission Investigation No. 337-TA-561
Law Firm: Finnegan, Henderson et al, Washington DC
Deposition Testimony

November 9-10, 2006, Washington DC
Certain Combination Motor and Transmission
Systems and Devices Used Therein, and
Products Containing the Same
(Solomon Technologies v Toyota Motor Corporation),
U.S. International Trade Commission Investigation No. 337-TA-561
Law Firm: Finnegan, Henderson et al, Washington DC
Trial Testimony

December 7, 2006, Clinton Township, MI
Dolan (Kathleen), Individually and as
Personal Representative of the Estate
Of Mary Anne Torpey, Deceased,
Joan Gorman, Bonnie Polt, Individually
And as Next Friend of Glen Polt, Jr.,
Glen Polt and Kristin Polt, Plaintiffs,
v. Ford Motor Company, Inc., Jerome Duncan
(Ford Dealership) and Peggy Thompson,
Defendants
Case No. 04-3074-N1
Law Firm: Bowman and Brooke, Minneapolis, MN
Trial Testimony

Edward M. Caulfield, Ph.D., P.E
Testimony Record

December 20, 2006, San Francisco, CA
Pitts v. Ford
Case No. FCS026087
Law Firm: Bowman & Brooke, San Jose, CA
Deposition

January 4, 2007, Naperville, Illinois
Lum v. Mercedes Benz
Case No. 3:05 CV7191
Law Firm: Carroll Burdick & McDonough, San Francisco, CA
Deposition

January 9, 2007, Natchez, Mississippi
Yancy (Raymond) v. Ford Motor Company, Inc.
Case No. 02-KV-0272S
Law Firm: McGuire Woods, Richmond Virginia
Deposition

EX-9

GOLF BALL TESTING PROTOCOLS
Bridgestone vs. Acushnet

Protocol for Core Hardness and Diameter Measurements

This protocol describes the steps to be taken for accurately measuring the hardness at different locations on and inside of the golf ball core. The core hardness test method is in accordance with JIS K6301 – Physical Testing Methods for Testing Vulcanized Rubbers and JIS K6253 – Hardness Testing Methods for Rubber, Vulcanized or Thermoplastic, copies of which are attached as Exhibits C and D, unless otherwise specified.

CORE DIAMETER

BALLS: Pro V1, Pro V1x, Pro V1*, NXT, NXT Tour, DT So/Lo, and Exception

1. Randomly select golf balls of a single type and record all required information as set forth in the GENERAL INSTRUCTIONS.

2. Remove the outer cover and intermediate layers (if present) of the golf ball by using a side cutter. The cutting tool should be advanced into the ball at small increments to ensure that the core is not scarred or scarring is at a minimum.

   a. Prior to cutting remove the cover, refer to photographs of the subject golf ball specimen sectioned in half, or a data chart, to determine the core color, and ball structure. This will notify operator of a possible intermediate layer, and aid in identifying when the operator is close to the core surface.

   b. NOTE: All Pro V1, Pro V1x and Pro V1* golf balls will have a clear intermediate layer before the core. All NXT, NXT Tour, DT So/Lo and Pinnacle Exception golf balls will only have a cover before the core.

3. Manually peel the cover and intermediate layer, if present, of the golf ball to expose the solid core.

   ONCE THE CORE IS EXPOSED ALL OF THE FOLLOWING HARDNESS TESTING FOR THE CORE SURFACE MUST BE COMPLETED WITHIN 24 HOURS.

4. Mark or placard each of the separated components (core, cover and intermediate layer) with the serial number of the golf ball. Place each of the marked or placarded cover and intermediate layer sections in individual packaging marked with the ball serial number.

5. Closely examine the core surface adjacent to the cutting tool path to determine if the core surface was scarred or otherwise nicked by the cutting tool.

a. No testing of the core surface hardness can take place within 20 degrees of the surface scarring.

6. Using a digital height gauge measure and record the outermost diameter of the core at five (5) randomly selected core orientations, not within 30 degrees of each other. Further, the core diameter measurement cannot take place where the core has been nicked or scarred.

    a. Prior to making any measurements, the accuracy of the height gauge must be verified using a certified gauge block.

7. Using the determined average core diameter of each core calculate the standard deviation of the averages.

CORE SURFACE HARDNESS

This test is required to be performed on all NXT, NXT Tour, DT So/Lo, Pinnacle Exception and Pro V1 golf balls. The core hardness test method is in accordance with JIS K6301 – Physical Testing Methods for Testing Vulcanized Rubbers and JIS K6253 – Hardness Testing Methods for Rubber, Vulcanized or Thermoplastic, unless otherwise specified.

BALLS: Pro V1, Pro V1x, Pro V1*, NXT, DT So/Lo, and Exception

8. Verify hardness tester accuracy by performing hardness testing on calibration block.

    a. Hardness results performed on the calibration block must be within the limits specified on the calibration block.

    b. If the machine is not in calibration do not continue.

9. Perform hardness measurements in the JIS C hardness scale at five (5) locations on the surface of the ball. Each of the five points are to be randomly selected and are to be marked to identify the location of the hardness test. The hardness measurement points must not be within 20 degrees of each other, and are not to have any scarring or nicks. Further, at each of the five locations five (5) individual and discrete measurements are to be taken.

    a. The JIS C testing should be in accordance with the JIS K6301 standards. It is recognized that the core is a round surface, however, this deviation from the hardness standard is acceptable.

    b. Confirm the highest point of the core is the point that is being tested. The presser foot of the indenter must not contact the core's surface until the indenter is completely immerged into the material.

c. The locations of the hardness measurement points are to be selected taking into account the protocol set forth below regarding testing at 5 mm within the surface of the core, so as to minimize the number of measurement points which are permanently lost when that protocol is performed.

10. Record each individual measurement in a data table and calculate an average for each of the five locations tested. Using these five averages calculate a core surface hardness average. Record the averages in the data table.

11. Using the determined average hardness at the surface of each core calculate the standard deviation of the averages.

HARDNESS AT 5MM WITHIN THE SURFACE OF THE CORE

This test is only required to be performed on NXT, DT So/Lo and Pinnacle Exception golf balls, and is not to be performed on any Pro V1 golf balls. The core hardness test method is in accordance with JIS K6301 – Physical Testing Methods for Testing Vulcanized Rubbers and JIS K6253 – Hardness Testing Methods for Rubber, Vulcanized or Thermoplastic, unless otherwise specified.

BALLS: NXT, DT So/Lo, and Exception

12. Remove cover in accordance with Steps 2 and 3 above.

13. Select a portion of the core to be tested, preferably not resulting in the removal or discarding any core surface hardness testing locations.

14. Machine gripping surfaces or slots in the core opposite from the selected portion of the core to be tested, as described in other testing protocols so as to allow for the secure gripping of the core.

15. Use a band saw to cut off the selected portion of the core (selected in Step 12) at a point at least 8 mm from the surface of the core, so as to create a specimen which is at least 8 mm in thickness at its deepest point.

    a. Store the remaining core section in a sealed, evacuated container/package so as to limit exposure to the atmosphere, and place with the remaining ball components from the golf ball tested.

16. Secure the specimen created in Step 14 in a Bridgeport, or comparable, end-mill device in such a way to ensure the specimen is secure while minimizing squeezing and distorting the specimen. The specimen is to be secured such that the surface cut by the band saw is facing the end-mill tooling (i.e. curved surface away), and the surface is level.

GOLF BALL TESTING PROTOCOLS
Bridgestone vs. Acushnet

ONCE THE FOLLOWING MACHINING PROCESS BEGINS ALL OF THE FOLLOWING HARDNESS PROTOCOL FOR 5 MM WITHIN THE CORE SURFACE MUST BE COMPLETED WITHIN 24 HOURS.

17. Using the Bridgeport, or comparable, end-mill machine, machine off the cut surface of the specimen in multiple passes. The depth of each pass is to minimal such that the specimen is not destroyed during the process or dislodged from the end-mill gripping vise.

    a. A cutting head and cutting speed must be used to minimize burrs and heat generation during the machining process.

    b. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

18. The amount of material to be removed is to result with a test specimen which is 5 mm thick at its thickest point.

    a. As the 5 mm limit is approached the depth of each pass is to be reduced to a depth of no more than 0.05 mm. This will ensure minimal damage and scarring to the surface of the specimen.

    b. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

    c. The tolerance of the thickness of the specimen, at its thickest point is 5 mm +/- 0.2 mm. If the amount of removed material is within this tolerance, the test may proceed.

19. Inspect the machined surface of the test specimen. If the surface is smooth testing may proceed. If the test surface is not smooth it is to be hand buffed to provide a smooth surface.

20. Record the height of the test specimen.

    a. The tolerance of the 5 mm thickness is +/- 0.2 mm. If the amount of removed material is within this tolerance, the test may proceed.

    b. If the test specimen is not within this tolerance, but is within an additional +/- 0.2 mm, the specimen may be tested but its non-compliance with the above tolerance is to be recorded.

    c. Locate and identify the center of the machined surface.

21. Verify hardness tester accuracy by performing hardness testing on calibration block.

a. Hardness results performed on the calibration block must be within the limits specified on the calibration block.

b. If the machine is not in calibration do not continue, and calibrate machine accordingly.

22. Perform hardness test in accordance with JIS C standard at the center of the machined surfaces. Five (5) separate and discrete tests are to be done at the center of each of the machined surfaces.

23. Record each of the (five) 5 measurements, for each side, and determine and record an average of the (five) 5 measurements, for each side. Each data point is to be recorded.

24. Determine and record a core hardness average by calculating an average based on the averages from each respective milled surfaces.

25. Store the tested specimen in a sealed, evacuated container/package so as to limit exposure to the atmosphere, and place with the remaining ball components from the golf ball tested.

26. Using the determined average hardness at 5 mm within the surface of each core calculate the standard deviation of the averages.

CORE CENTER HARDNESS:

This test is required to be performed on all NXT, DT So/Lo, Pinnacle Exception and Pro V1 golf balls. The core hardness test method is in accordance with JIS K6301 – Physical Testing Methods for Testing Vulcanized Rubbers and JIS K6253 – Hardness Testing Methods for Rubber, Vulcanized or Thermoplastic, unless otherwise specified.

BALLS: Pro V1, Pro V1x, Pro V1*, NXT, DT So/Lo, and Exception

27. Repeat Steps 1 through 6 above on randomly selected golf balls; OR

a. For NXT, NXT Tour, DT So/Lo and Pinnacle Exception golf balls, it is possible to use the twelve (12) cores from Steps 1-11.[1]

ONCE THE FOLLOWING MACHINING PROCESS BEGINS ALL OF THE FOLLOWING HARDNESS PROTOCOL FOR CORE CENTER HARDNESS MUST BE COMPLETED WITHIN 24 HOURS.

[1] For Pro V1 model golf balls the protocol for Core Hardness Distribution may be conducted first, followed by the protocol for measuring core center hardness.

28. Using the Bridgeport, or comparable, end-mill machine, machine off the section of the core selected for removal to a depth within 0.3 to 0.4 mm above the calculated center of the core.

    a. The entire depth of removed material should not be machined off in one pass, but a plurality of passes not exceeding a depth of 1 mm is to be used.

    b. A cutting head and cutting speed must be used to minimize burrs and heat generation during the machining process.

    c. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

29. To reach the final depth of the core center, the machined surface is to be buffed with no GREATER than 220 grit sandpaper, or comparable abrasive, to provide smooth surface free of machining marks and/or grooves. The buffing step must be done at a slow speed to minimize heat generation at the surface of the core, and a depth of no more than 0.05 mm for any one pass.

    a. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

30. Locate and identify the center of the machined surface.

31. Record the new ball diameter.

32. The tolerance of the center of the core is +/- 0.2 mm. If the amount of removed material is within this tolerance, the test may proceed.

33. Verify hardness tester accuracy by performing hardness testing on calibration block.

    a. Hardness results performed on the calibration block must be within the limits specified on the calibration block.

    b. If the machine is not in calibration do not continue, and calibrate machine accordingly.

34. Perform hardness test in accordance with JIS C standard at the center of the machined surface. Five (5) separate and discrete tests are to be done at the center of the machined surface.

35. Record each of the (five) 5 measurements and determine and record an average of the (five) 5 measurements.

36. Store the remaining core section in a sealed, evacuated container/package so as to limit exposure to the atmosphere, and place with the remaining ball components from the golf ball tested.

    a. The cores of the Pro V1 model golf balls may be used in the following protocol for CORE HARDNESS DISTRIBUTION. If this is done the CORE HARDNESS DISTRIBUTION test must be done within 24 hours of exposure of the center of the core.

37. Using the determined average hardness at the center of the core calculate the standard deviation of the averages.

CORE HARDNESS GRADIENT:

This test is required to be performed on all Pro V1 and Pro V1x[2] model golf balls and is not to be performed on any of the NXT, NXT Tour, DT So/Lo, and Pinnacle Exception golf balls. The core hardness test method is in accordance with JIS K6301 – Physical Testing Methods for Testing Vulcanized Rubbers and JIS K6253 – Hardness Testing Methods for Rubber, Vulcanized or Thermoplastic, unless otherwise specified.

BALLS: Pro V1 and Pro V1x

PRO V1

38. For **Pro V1** model golf balls, using the calculated diameter of the core from Steps 1 through 6, calculate the core radius and divide the radius into three (3) equidistant sections, which identifies two (2) evenly spaced points between the core center and the core surface along a single radial line to the surface.

    a. Record the core radius and measurement for the equidistant sections.

    b. Each of the evenly spaced points represent measurement depths for the core hardness distribution. The outermost point is the first measurement depth and the innermost point (not the center) is the second measurement point.

39. The core surface hardness is to be measured and recorded in accordance with the Core Surface Hardness protocol, set forth above.

40. Select a portion of the core to be removed, and mark the surface of the core.

41. Mount the core on a platen surface of a Bridgeport, or comparable, end-mill machine, using a mounting structure which minimizes squeeze of the core, while maintaining the core in a fixed position. The area marked in Step 40 shall be facing vertically and represent the highest point on the core's circumference.

[2] The protocol for the Pro V1x is different from that of the Pro V1, as set forth herein.

ONCE THE FOLLOWING MACHINING PROCESS BEGINS ALL OF THE FOLLOWING HARDNESS PROTOCOL MUST BE COMPLETED WITHIN 24 HOURS.

42. Using the Bridgeport, or comparable, end-mill machine, machine off the section of the core selected for removal to a depth of 0.3 to 0.4 mm above the first measurement depth of the core.

    a. The entire depth should not be machined off in one pass, but a plurality of passes in which a set depth of material is removed in each pass. As the desired cut depth approaches each pass should not exceed a depth of more than 1 mm to ensure accuracy.

    b. A cutting head and cutting speed must be used to minimize burrs and heat generation during the machining process.

    c. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

43. To reach the final depth of the first measurement depth, the machined surface is to be buffed with no GREATER than 220 grit sandpaper, or comparable abrasive, to provide smooth surface free of machining marks and/or grooves. The buffing step must be done at a slow speed to minimize heat generation at the surface of the core, and a depth of no more than 0.05 mm for any one pass.

    a. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

44. Locate and identify the center of the first measurement surface and mark the center

45. Record the new ball diameter.

    a. The tolerance of the first measurement surface is +/- 0.2 mm. If the amount of material removed is within this tolerance, the test may proceed.

46. At a position 180 degrees from the first measurement surface, create the second measurement surface (from the results in Step 38b) repeating Steps 42 through 44 above.

47. Locate and identify the center of the second measurement surface and mark the center.

48. Record the new ball diameter.

    a. The tolerance of the second measurement surface is +/- 0.2 mm. If the amount of material removed is within this tolerance, the test may proceed.

49. Verify hardness tester accuracy by performing hardness testing on calibration block.

    a. Hardness results performed on the calibration block must be within the limits specified on the calibration block.

    b. If the machine is not in calibration do not continue, and calibrate machine accordingly.

50. Perform hardness test in accordance with JIS C standard at the center of the two machined measurement surfaces. Five (5) separate and discrete tests are to be done at the center of the machined surface.

51. Record each of the five (5) measurements and determine and record an average of the (five) 5 measurements.

52. If the core center hardness is to be determined, proceed to the Core Center Hardness protocol and complete the core center hardness test.

53. Using the determined average hardness on each of the measurement surfaces, calculate the standard deviation of the averages for each of the respective measurement surfaces.

<u>**PRO V1x**</u>

54. For **Pro V1x** model golf balls, using the calculated diameter of the core from Steps 1 through 6, calculate the core radius.

    a. Record the core radius.

    b. For the purposes of measuring the hardness distribution of the Pro V1x golf balls, the depths of measurement are laid out below:

        i. First measurement depth is 3.5 mm from the core surface.

        ii. Second measurement depth is at the surface of the center portion of the core (i.e. gray color portion in model ◀ Pro V1x-332 ▶ and blue color portion in model ◀●Pro V1x 332●▶).[3]

        iii. Third measurement depth is at 6.4 mm below the second measurement depth.

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[3] The target diameter of the core is 1.55 inches whereas the target diameter of the inner portion of the core is 1.0 inches. Accordingly, the third measurement depth is approximately 7.0 mm below the surface of the core.

iv. Fourth measurement depth is at the center of the inner portion of the core, determined based on the calculated radius of the core.

55. The core surface hardness is to be measured and recorded in accordance with the Core Surface Hardness protocol, set forth above.

56. Select a portion of the core to be removed, and mark the surface of the core.

57. Mount the core on a platen surface of a Bridgeport, or comparable, end-mill machine, using a mounting structure which minimizes squeeze of the core, while maintaining the core in a fixed position. The area marked in Step 56 shall be facing vertically and represent the highest point on the core's circumference.

ONCE THE FOLLOWING MACHINING PROCESS BEGINS ALL OF THE FOLLOWING HARDNESS PROTOCOL MUST BE COMPLETED WITHIN 24 HOURS.

58. Using the Bridgeport, or comparable, end-mill machine, machine off the section of the core selected for removal to a depth of 0.3 to 0.4 mm above the first measurement depth of the core.

    a. The entire depth should not be machined off in one pass, but a plurality of passes in which a set depth of material is removed in each pass. As the desired cut depth approaches each pass should not exceed a depth of more than 1 mm to ensure accuracy.

    b. A cutting head and cutting speed must be used to minimize burrs and heat generation during the machining process.

    c. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

59. To reach the final depth of the first measurement depth, the machined surface is to be buffed with no GREATER than 220 grit sandpaper, or comparable abrasive, to provide smooth surface free of machining marks and/or grooves. The buffing step must be done at a slow speed to minimize heat generation at the surface of the core, and a depth of no more than 0.05 mm for any one pass.

    a. At least 10 seconds should elapse between each machining pass to allow for heat dissipation.

60. Locate and identify the center of the first measurement surface and mark the center.

61. Record the new ball diameter.

GOLF BALL TESTING PROTOCOLS
Bridgestone vs. Acushnet

a. The tolerance of the first measurement surface is +/- 0.2 mm. If the amount of material removed is within this tolerance, the test may proceed.

62. At a position 180 degrees from the first measurement surface, create the second measurement surface repeating Steps 58 through 59 above.

63. Locate and identify the center of the second measurement surface and mark the center.

64. Record the new ball diameter.

    a. The tolerance of the second measurement surface is +/- 0.1 mm. If the amount of material removed is within this tolerance, the test may proceed.

65. Verify hardness tester accuracy by performing hardness testing on calibration block.

    a. Hardness results performed on the calibration block must be within the limits specified on the calibration block.

    b. If the machine is not in calibration do not continue, and calibrate machine accordingly.

66. Perform hardness test in accordance with JIS C standard at the center of the first two measurement surfaces. Five (5) separate and discrete tests are to be done at the center of the machined surface.

67. Record each of the (five) 5 measurements and determine and record an average of the (five) 5 measurements.

68. Machine the second measurement surface to the third measurement surface following the same procedures set forth above in Steps 58 - 61.

69. Perform hardness test in accordance with JIS C standard at the center of the machined surface of the third measurement surface. Five (5) separate and discrete tests are to be done at the center of the machined surface.

70. Record each of the (five) 5 measurements and determine and record an average of the (five) 5 measurements.

71. For the fourth measurement surface (core center hardness), proceed to the Core Center Hardness protocol and complete the core center hardness test.

72. Using the determined average hardness on each of the measurement surfaces, calculate the standard deviation of the averages for each of the respective measurement surfaces.

EX-18

TABLE VI
CORE HARDNESS RESULTS (JIS C)
Pro V1, Pro V1 Star, NXT, DT So/Lo and Pinnacle Exception

Ball Model		Surface (JIS C)	Within 5mm of Core Surface (JIS C)	Difference - Surface and 5mm (JIS C)	Core Center (JIS C)
P2	Average	82.8			63.3
	Standard Deviation	1.06			1.41
	Minimum	81.4			61.4
	Maximum	84.2			65.2
PS	Average	86.8			
	Standard Deviation	1.13			
	Minimum	85.0			
	Maximum	90.2			
N2	Average	81.8	77.3	5.4	60.4
	Standard Deviation	1.10	0.85	0.88	1.55
	Minimum	79.4	74.6	4.0	56.4
	Maximum	84.8	79.0	7.2	64.0
N1	Average	83.2			61.7
	Standard Deviation	0.74			1.29
	Minimum	82.0			59.6
	Maximum	85.0			64.2
D2	Average	82.1	78.4	5.5	61.8
	Standard Deviation	3.39	1.49	1.16	1.38
	Minimum	71.4	74.0	2.0	58.8
	Maximum	86.6	79.4	6.8	65.0
D1	Average	85.3			63.1
	Standard Deviation	0.33			1.67
	Minimum	84.6			59.4
	Maximum	86.0			66.4
E2	Average	79.1	78.9	4.6	61.0
	Standard Deviation	3.21	1.77	1.35	1.29
	Minimum	72.8	74.2	1.2	59.0
	Maximum	83.0	80.2	6.2	64.2
E1	Average	83.9	79.0	5.0	61.9
	Standard Deviation	1.01	0.56	0.64	1.41
	Minimum	82.0	78.0	3.2	58.6
	Maximum	85.6	80.0	6.0	65.0

EXHIBIT 4

REDACTED

EXHIBIT 5

REDACTED

EXHIBIT 6

REDACTED

EXHIBIT 7

LEXSEE 1999 US DIST LEXIS 12447

E.I. DUPONT DE NEMOURS & CO., Plaintiff, v. MILLENNIUM CHEMICALS, INC. and MILLENNIUM INORGANIC CHEMICALS, INC., Defendants.

C.A. No. 97-237-SLR

UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

1999 U.S. Dist. LEXIS 12447

August 2, 1999, Decided

NOTICE: **[*1]** FOR ELECTRONIC PUBLICATION ONLY

DISPOSITION: Defendant's motion for summary judgment and plaintiff's motion to dismiss denied and plaintiff's motion to strike granted in part and denied in part.

COUNSEL: For Plaintiff: Richard L. Horwitz, Esquire, Joanne Ceballos, Esquire, Potter, Anderson & Corroon LLP, Wilmington, Delaware.

For Plaintiff: John C. Vassil, Esquire, Bruce D. DeRenzi, Esquire, Of counsel, Morgan & Finnegan, L.L.P., New York, New York.

For Defendants: Jack B. Blumenfeld, Esquire, Morris, Nichols, Arsht & Tunnell, Wilmington, Delaware.

For Defendants: David A. Kalow, Esquire, Kenneth L. Bressler, Esquire, Kalow, Springut & Bressler LLP, New York, New York.

JUDGES: Sue L. Robinson, District Judge.

OPINION BY: Sue L. Robinson

OPINION:

MEMORANDUM OPINION

Dated: August 2, 1999
Wilmington, Delaware

Robinson, District Judge

I. INTRODUCTION

Plaintiff E.I. DuPont De Nemours & Co. filed this patent infringement action against Millennium Chemicals, Inc. and Millennium Inorganic Chemicals, Inc. (collectively, "defendant") on May 1, 1997. Plaintiff is incorporated under the laws of Delaware and has its principal place of business in Wilmington, Delaware. (D. **[*2]** I. 137, P 2) Defendant is also a Delaware corporation with its principal places of business in Iselin, New Jersey and Hunt Valley, Maryland. (D.I. 137, PP 3-4) The court has jurisdiction over this action under *28 U.S.C. §§ 1331* and 1338. Venue is proper in this judicial district by virtue of *28 U.S.C. §§ 1391*(c) and 1400(b).

Currently before the court is defendant's motion for summary judgment (D.I. 92) and plaintiff's motion to dismiss, or in the alternative, to strike in whole or in part defendant's second and third counterclaims (D.I. 168). In its motion, defendant argues that plaintiff's patents violate the definiteness requirement of *35 U.S.C. § 112* and therefore are invalid. For its part, plaintiff seeks dismissal of defendant's second and third counterclaims as untimely; in the alternative, plaintiff moves the court to strike all or part of defendant's counterclaims for failure to comply with the applicable statute of limitations. For the following reasons, the court shall deny both defendant's motion for summary judgment and plaintiff's motion to dismiss and grant in part plaintiff's motion to strike.

[*3] II. BACKGROUND

Plaintiff is the assignee of U.S. Patent Nos. *5,631,310* ("the *'310* patent") and *5,889,090* ("the *'090* patent"). n1 These patents disclose processes for manufacturing "highly loaded" silanized titanium dioxide pigments in polyethylene or other polymer concentrates. Manufacturers use titanium dioxide pigment, which is white, to color various products, including plastics (such as trash bags and diaper linings), paints, and paper. This suit involves the use of these pigments in the plastic film market. (D.I. 160, P 49) There are three steps involved in coloring plastics using titanium dioxide pigment. First, the titanium dioxide pigment is coated with silanes or other materials. Second, the coated titanium dioxide

pigment is shipped to a masterbatch, or concentrate, maker who forms the masterbatch by adding plastic to the pigment. Third, the masterbatch maker sells this concentrate to a plastic manufacturer who, in turn, adds more plastic to the concentrate and extrudes the pigmented plastic into film for use in various consumer products. (D.I. 93 at 4)

n1 Initially, plaintiff alleged that defendant induced infringement of U.S. Patent No. *5,607,994* (the " *'994* patent"), a product patent disclosing a "polyethylene matrix consisting essentially of polyethylene and about 50 to about 87% by weight silanized [titanium dioxide] pigment." (D.I. 93, Ex. A, *'994* patent, col. 8, lns. 20-23) After defendant filed the instant motion for summary judgment, plaintiff filed a second amended complaint (D.I. 137), which substituted the *'090* process patent for the *'994* patent. Plaintiff appears to have abandoned suit over the *'994* patent, focussing instead on defendant's alleged inducement of infringement of the *'090* and *'310* patents. Defendant's instant motion for summary judgment addresses only the *'994* and *'310* patents. Because the *'994* patent is no longer the subject of suit, the court shall address only defendant's arguments touching on the *'310* patent.

[*4]

In the past, the use of titanium dioxide pigment in plastics had several processing disadvantages and often resulted in product quality problems. The processing disadvantages included poor dispersability of the pigment, high energy requirements for mixing the pigment, and low productivity. The pigment concentrate also occasionally produced "lacing" (holes or tears in the plastic film) and noxious gases or rendered the film resistant to printing. (D.I. 97 at 5) In response to consumer demand for less problematic pigmentation methods, both plaintiff and defendant developed "highly loaded" preparations of coated, silanized titanium dioxide pigment, which purportedly reduce the aforementioned processing and product quality disadvantages. In its second amended complaint, plaintiff alleges that defendant has induced infringement of the *'310* and *'090* patents through the manufacture, advertisement, promotion, and sale of silanized titanium dioxide pigment under the trade name "TiONA(R) RCL-188" (hereafter, "RCL-188") for use by masterbatch manufacturers in polyethylene concentrates. (D.I. 137, PP 5-8)

III. DISCUSSION

A. Defendant's Motion for Summary Judgment

Defendant **[*5]** argues that several terms used in the claims of the *'310* patent are ambiguous and, therefore, are invalid for indefiniteness. Defendant points to the *'310* patent's use of "coating," "mixture," and "at least one" as examples of such indefiniteness. In interrogatories, defendant asked plaintiff to clarify the meaning of each of these disputed terms, but plaintiff refused "on the ground that it is premature in seeking the contentions of [plaintiff] during the initial phase of discovery." (D.I. 93, Ex. C at 2, 4, 5) The *'310* patent employs these allegedly indefinite terms in the following manner.

1. "Coating"

The *'310* patent uses "coating" as a verb to describe the process of coating the pigment with "at least one organosilicon compound." (D.I. 93, Ex. B, col. 8, lns. 24-25, 58) Defendant contends, without supporting evidence, that the ambiguity of "coating"

> lies in the fact that the chemical composition of the silane, if added to water, may change at the very least from (i) the time the ingredients are mixed to (ii) the time they attach to the pigment.

(D.I. 93 at 6) Due to this purported ambiguity, it is allegedly impossible to determine whether the *'310* patent **[*6]** covers the formula for silane as it is added to water or the formula for silane as (or after) it coats the titanium dioxide pigment. (D.I. 93 at 7)

2. "Mixture"

Claim 3 of the *'310* patent discloses a process for coating a titanium dioxide pigment with an organosilicon compound "comprising a **mixture** of . . . (a) at least one silane . . . and (b) . . . at least one polysiloxane . . . ." (D.I. 93, Ex. B, col. 8, lns. 59-60; col. 9, ln. 5) Defendant asserts that the ambiguity lies in the patent's failure to claim the proportions of silane to polysiloxane which qualify as a mixture. (D.I. 93 at 7)

3. "At least one"

Finally, the *'310* patent describes the pigment coating as comprising "at least one" silane or mixtures of "at least one" silane and "at least one" polysiloxane. (D.I. 93, Ex. B., col. 8, ln. 24, 60; col. 9, ln. 5) Defendant argues that this phrase is indefinite because the claims do not provide the meaning of, or the units of measurements associated with, the phrase "at least one." (D.I. 93 at 8)

On a motion for summary judgment, the movant bears the burden of proving that no genuine issue of material fact exists. See *Matsushita Elec. Indus. Co. v. Zenith Radio Corp., 475 U.S. 574, 586, 89 L. Ed. 2d 538, 106 S.*

Ct. 1348 (1986). **[*7]** A court shall grant summary judgment only if "the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." *Fed.R.Civ.P. 56(c).* If a moving party fails to establish the absence of a genuine issue of fact, "'summary judgment must be denied **even if no opposing evidentiary matter is presented.**'" *Adickes v. S. H. Kress & Co., 398 U.S. 144, 160, 26 L. Ed. 2d 142, 90 S. Ct. 1598 (1970)* (quoting Advisory Committee Note on 1963 Amendment to Rule 56(e)).

In the context of the instant motion, defendant must demonstrate that there is no genuine issue of material fact with respect to the indefiniteness of the *'310* patent claims. A patent claim is indefinite and, therefore, invalid if the claims fail to "particularly point[] out and distinctly claim[] the subject matter which the applicant regards as his invention." *35 U.S.C. § 112.* Although compliance with § 112 is a question of law, see *Orthokinetics, Inc. v. Safety Travel Chairs, Inc., 806 F.2d 1565, 1576 (Fed. Cir. 1986),* **[*8]** it rests on a determination of "whether one skilled in the art would understand the bounds of the claim when read in light of the specification." *Miles Labs., Inc. v. Shandon, Inc., 997 F.2d 870, 875 (Fed. Cir. 1993).* "If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, § 112 demands no more." Id. The degree of precision necessary to satisfy § 112 depends upon the subject matter and cannot be viewed in the abstract. See id.; *Shatterproof Glass Corp. v. Libbey-Owens Ford Co., 758 F.2d 613, 624 (Fed. Cir. 1985).*

At issue, then, is whether one skilled in the art would find the *'310* patent's use of these disputed terms indefinite. Defendant, however, offers neither evidence of the requisite degree of skill in the art nor evidence of how one skilled in the art would interpret the disputed terms. Instead, defendant merely argues in rhetorical fashion that the aforementioned terms are indefinite. Defendant cannot prevail by arguing that these terms are indefinite to **any** reader of the patent; rather, defendant must demonstrate that those **skilled in the art** would find **[*9]** them indefinite. See *Miles Labs., 997 F.2d at 875.* Terms that appear facially ambiguous to the lay reader may be perfectly definite to those versed in the technology at issue. See, e.g., *Andrew Corp. v. Gabriel Elecs., Inc., 847 F.2d 819, 821 (Fed. Cir. 1988)* (explaining that terms such as "closely approximate," "approach each other," and "substantially equal" are upheld by courts "when serving reasonably to describe the claimed subject matter to those of skill in the field of the invention"); *Seattle Box Co. v. Industrial Crating & Packing, Inc., 731 F.2d 818, 826 (Fed. Cir. 1984)* (finding phrase "substantially equal to" sufficiently definite). On a motion for summary judgment, abstract and rhetorical arguments in support of indefiniteness simply do not satisfy defendant's burden of proof.

Defendant also argues that the court should infer indefiniteness from plaintiff's refusal, in its responses to defendant's interrogatories, to clarify the meaning of the disputed terms. Neither the law nor logic supports such an inferential leap. On a motion for summary judgment, the nonmoving party need not present opposing evidence of definiteness **[*10]** where, as here, the movant has failed to show the absence of genuine factual disputes. See *Adickes, 398 U.S. at 160.* Because defendant has failed to demonstrate the absence of genuine issues of material fact with respect to whether one skilled in the art would understand the disputed terms, the court shall deny defendant's motion for summary judgment.

B. Plaintiff's Motion to Dismiss or, in the Alternative, to Strike

Plaintiff moves the court, pursuant to *Fed.R.Civ.P. 12(b)(6),* to dismiss defendant's second and third counterclaims as untimely compulsory counterclaims filed without leave of court. In the alternative, plaintiff moves pursuant to *Fed.R.Civ.P. 12(f)* to strike defendant's second and third counterclaims as barred by the Delaware statute of limitations. (D.I. 168) Defendant asserted these counterclaims in its May 14, 1999 answer to plaintiff's second amended complaint. (D.I. 160) Defendant's second counterclaim alleges that plaintiff violated § 43(a) of the Lanham Act by making false and deceptive statements about defendant's RCL-188 product. (D.I. 160, PP 71-73) The third counterclaim asserts a state law unfair competition claim based on these same **[*11]** allegations. (D.I. 160, PP 74-75)

1. Plaintiff's Motion to Dismiss

In support of its motion, plaintiff argues that defendant's second and third counterclaims are compulsory and, therefore, should have been asserted earlier than in its answer to plaintiff's second amended complaint. Plaintiff, however, offers no compelling justification for departing from the well established rule that a defendant may include counterclaims in its answer to an amended complaint. See *Standard Chlorine of Del., Inc. v. Sinibaldi, 1995 U.S. Dist. LEXIS 13913,* Civ. A. No. 91-188- *SLR, 1995 WL 562285,* at *2 (D. Del. Aug. 24, 1995); *Joseph Bancroft & Sons Co. v. M. Lowenstein & Sons, Inc., 50 F.R.D. 415, 419 (D. Del. 1970).* Courts in this district have reasoned that, because the amended pleading relates back to the date of the original pleading, the amending pleader "can hardly be heard to complain that claims filed against him are improper because they should have been asserted in response to his original pleading." *Joseph Bancroft & Sons, 50 F.R.D. at 419.*

In the present case, plaintiff filed its second amended complaint on April 7, 1999. (D.I. 137) In due course, defendant **[*12]** then filed its answer, which included the instant counterclaims. Under the settled law of this judicial district, defendant's counterclaims were filed in a timely manner. Thus, the court shall deny plaintiff's motion to dismiss.

2. Plaintiff's Motion to Strike

There remains, however, the issue of whether the relevant statute of limitations bars defendant from relying on some or all of the allegations asserted in support of its second and third counterclaims. The Lanham Act provides no statute of limitations. Generally, when a federal statute provides no statute of limitations federal courts look to the applicable state statute of limitations for guidance. See *Beauty Time, Inc. v. Vu Skin Sys., Inc., 118 F.3d 140, 143 (3d Cir. 1997).* Accordingly, the court must look to the Delaware statute of limitations for the relevant limitations period for both defendant's Lanham Act and state unfair competition counterclaims.

The Delaware statute of limitations provides that "no action based on a statute, and no action to recover damages caused by an injury unaccompanied with force . . . shall be brought after the expiration of 3 years from the accruing of the cause of **[*13]** such action. . . ." *10 Del. C. § 8106.* Because defendant's second counterclaim is "an action based on a statute" and defendant's third counterclaim is "an action to recover damages caused by an injury unaccompanied by force," Delaware's three year statute of limitations applies in the absence of an equitable exception.

Most of defendant's allegations fall within this three year period. Indeed, defendant asserts that plaintiff currently "is informing its customers and potential customers -- all of whom are either customers or potential customers of [defendant] --that the use of [defendant's] RCL-188 product will infringe [plaintiff's] patents, even though [plaintiff] knows . . . that its patents are invalid and unenforceable." (D.I. 160, P 63) Although defendant provides no specific dates for plaintiff's allegedly deceptive statements, defendant has asserted an ongoing pattern of misrepresentations and disparagement of its RCL-188 pigment by plaintiff. As such, these allegations fall within the limitations period. n2 Insofar as defendant relies on plaintiff's false statements about defendant's RCL-188 product, the statute of limitations does not bar defendant's second and **[*14]** third counterclaims.

n2 Defendant need not, as plaintiff argues, specify the exact date of these alleged falsehoods.

Defendant, however, also refers to a July 1995 incident in support of its second and third counterclaims. Specifically, defendant alleges that

> in or about July 1995, [plaintiff] distributed to customers and potential customers a brochure comparing two of its titanium dioxide products to [defendant's competing product, RCL-4]. In that brochure, [plaintiff] intentionally made the false claims that its R-101 and R-104 products had significantly better vinyl tinting strength than RCL-4 and better dispersability than RCL-4. In fact, [plaintiff's] own internal testing documents show otherwise. The brochure also falsely claimed that [defendant's] RCL-4 product contained methyl stearate -- a compound disfavored by customers -- when, in fact, RCL-4 contains no methyl stearate.

(D.I. 160, P 65) Because defendant filed its counterclaims in May of 1999, events relating to this 1995 **[*15]** brochure fall outside the three year limitations period. In the absence of some equitable exception, defendant cannot rely upon this 1995 brochure to support its second and third counterclaims.

Defendant claims that the "time of discovery rule" provides such an exception. The "time of discovery rule" tolls the statute of limitations where "an inherently unknowable injury . . . has been suffered by one blamelessly ignorant of the act or omission and injury complained of, and the harmful effect . . . develops gradually over a period of time . . . ." *Cavalier Group v. Strescon Indus., Inc., 782 F. Supp. 946, 951 (D. Del. 1992)* (internal quotations and citation omitted). The statute of limitations period is tolled until a person of ordinary intelligence and prudence would have had facts sufficient to put them on notice of an injury. Id. Defendant claims in its answering brief, but not in its counterclaims, that it was "blamelessly ignorant" of plaintiff's allegedly misleading brochure until discovery commenced in the present litigation. (D.I. 176 at 11)

The court finds that the "time of discovery" rule is not applicable to the instant case. A misleading product brochure **[*16]** is not an "inherently unknowable injury," especially when the brochure in question was distributed to "potential customers" in a highly competitive market. As such, defendant's counterclaims with respect to this 1995 incident are barred by the statute of limitations. Moreover, the 1995 brochure is irrelevant and immaterial to the issues at bar because it refers to completely different products than those allegedly covered by the *'310*

and *'090* patents. Accordingly, pursuant to *Fed.R.Civ.P. 12(f)*, the court shall strike P 65 from defendant's second and third counterclaims.

IV. CONCLUSION

For the aforementioned reasons, the court shall deny defendant's motion for summary judgment and plaintiff's motion to dismiss and grant in part and deny in part plaintiff's motion to strike. An appropriate order shall issue.